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Ontario Legislative Assembly

54

SESSIONAL PAPERS

VOLUME XXXVI.—PART VI.

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SECOND SESSION OF TENTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO.

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SESSION 1904.

TORONTO:
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1904.

LIST OF SESSIONAL PAPERS.

ARRANGED ALPHABETICALLY.

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Accounts, Public	1	*Printed.*
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Algoma Central and Hudson Bay Railway. Papers *in re* guarantee	85	*Printed.*
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“ Department of, in University	88	*Not printed.*
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No. 1 . . . Public Accounts of the Province for the year 1903. Presented to the Legislature, February 4th 1904. *Printed.*

No. 2 . . . Estimates for the service of the Province until the Estimates of the year are finally passed. Presented to the Legislature, 28th January, 1904. *Not Printed.* Estimates for the year 1904. Presented to the Legislature, 5th February, 1904. *Printed.* Estimates for the service of the Province until the Estimates of the year are finally passed. Presented to the Legislature, 29th March, 1904. *Not Printed.* Estimates (Supplementary) for the year 1904. Presented to the Legislature, 23rd April, 1904. *Printed.*

No. 3 . . . Report of the Commissioner of Crown Lands for the year 1903 Presented to the Legislature, 14th March, 1904. *Printed.*

No. 4 . . . Report of the Clerk of Forestry for the year 1903. Presented to the Legislature, 7th April, 1904. *Printed.*

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No. 7 . . Report of the Commissioner of Public Works for the year 1903. Presented to the Legislature, 22nd February, 1904. *Printed.*

No. 8 . . . Report of the Inspectors of Factories for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 9 . . . Report relating to the registration of Births, Marriages and Deaths for the year 1902. Presented to the Legislature, 4th February, 1904. *Printed.*

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No. 10 . . Report of the Inspector of Insurance, for the year 1903. Presented to the Legislature, 7th April, 1904 *Printed*

No. 11 . Loan Corporations Statements by Building Societies, Loan and other Companies, for the year 1903. Presented to the Legislature, 7th April, 1904. *Printed*

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No. 12 . . Report of the Minister of Education, Parts I and II, for the year 1903, with the Statistics of 1902. Presented to the Legislature, 10th February, 1904 *Printed.*

No. 13 . . Auditors' Report to the Board of Trustees, University of Toronto, on Capital and Income Accounts, for the year ending 30th June, 1903. Presented to the Legislature, 4th February, 1904. *Printed.*

No. 14 . . Report of the Ontario Agricultural College and Experimental Farm, for the year 1903. Presented to the Legislature, 30th March, 1904. *Printed.*

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No. 15 . . Report of the Ontario Agricultural and Experimental Union of the Province, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 16 . . Report of the Fruit Growers' Association of the Province, for the year 1903. Presented to the Legislature, 15th April, 1903. *Printed.*

No. 17 . . Report of the Fruit Experiment Stations of the Province, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed*

No. 18 . . Report of the Inspector of Fumigation Appliances of the Province, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 19 . . Report of the Entomological Society, for the year 1903. Presented to the Legislature, 14th March, 1904. *Printed.*

No. 20 . . Report of the Bee-Keepers' Associations of the Province, for the year 1903 Presented to the Legislature, 15th April, 1904. *Printed.*

CONTENTS OF VOL. VII.

No. 21 . . Hand-book for the use of Women's Institutes in Ontario. Presented to the Legislature, 10th February, 1904. *Printed for distribution only.*

No. 22 .. Reports of the Dairymen's Associations of the Province, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 23 .. Reports of the Live Stock Associations of the Province, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 24 .. Report of the Registrar of Live Stock of the Province, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 25 .. Report of the Farmers' Institutes of the Province, for the year 1903. Presented to the Legislature, 10th February, 1904. *Printed.*

No. 26 .. Report of Ontario Fairs and Exhibitions of the Province, for the year 1903. Presented to the Legislature, 10th February, 1904. *Printed.*

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No. 27 .. Report of the Bureau of Industries of the Province, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 28 .. Report of the Commissioner of Highways, for the year 1903. Presented to the Legislature, 7th March, 1904. *Printed.*

No. 29 .. Report of the Bureau of Labour, for the year 1903. Presented to the Legislature, 24th March, 1904. *Printed.*

No. 30 .. Report of the Ontario Game Commission, for the year 1903. Presented to the Legislature, 26th February, 1904. *Printed.*

No. 31 .. Report of the Department of Fisheries, for the year 1903. Presented to the Legislature, 5th April, 1904. *Printed.*

No. 32 .. Report of the Temiskaming and Northern Ontario Railway Commission, for the year 1903. Presented to the Legislature, 10th February, 1904. *Printed.*

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No. 33 .. Report of the Inspector of Division Courts, for the year 1903. Presented to the Legislature, 11th February, 1904. *Printed.*

No. 34 .. Report of the Inspector of Legal Offices, for the year 1903. Presented to the Legislature, 14th April, 1904. *Printed.*

No. 35 .. Report of the Inspector of Registry Offices, for the year 1903. Presented to the Legislature, 15th April, 1904. *Printed.*

No. 36 .. Report of the Provincial Board of Health, for the year 1903. Presented to the Legislature, 15th February, 1904. *Printed.*

No. 37 .. Report of the Secretary and Registrar of the Province, for the year 1903. Presented to the Legislature, 14th March, 1904. *Printed.*

No. 38 . . Report upon the Lunatic and Idiot Asylums of the Province for the year ending 30th September, 1903. Presented to the Legislature, 26th February, 1904. *Printed.*

No. 39 . . Report upon the Prisons and Reformatories of the Province, for the year ending 30th September, 1903. Presented to the Legislature, 24th March, 1904. *Printed.*

No. 40 . . Report upon the Hospitals and Charities of the Province, for the year ending 30th September, 1903. Presented to the Legislature, 30th March, 1904. *Printed.*

No. 41 . . Report upon the Institution for the Education of the Blind, Brantford, for the year ending 30th September, 1903. Presented to the Legislature, 8th February, 1904. *Printed.*

No. 42 . . Report upon the Institution for the Education of the Deaf and Dumb, Belleville, for the year ending 30th September, 1903. Presented to the Legislature, 8th February, 1904. *Printed.*

No. 43 . . Report of Superintendent, Neglected and Dependent Children of Ontario, for the year 1903. Presented to the Legislature, 22nd February, 1904. *Printed.*

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No. 44 . . Report upon the Inspection of Liquor Licenses, for the year 1903. Presented to the Legislature, 11th March, 1904. *Printed.*

No. 45 . . Report of the Provincial Municipal Auditor for the year 1903. Presented to the Legislature, 4th February, 1904. *Printed.*

No. 46 . . Return from the Records of the several Elections in the Electoral Divisions of Muskoka, Sault Ste. Marie and North Renfrew since the General Elections of May 29th, 1902, shewing: (1) The number of Votes polled for each candidate in the Electoral District in which there was a contest; (2) The majority whereby each successful Candidate was returned; (3) The total number of Votes polled in each District; (4) The number of Votes remaining unpolled: (5) The number of names on the Voters' Lists in each District; (6) The population of each District as shewn by the last census. Presented to the Legislature, 21st January, 1904. *Printed.*

No. 47 . . Report upon the state of the Library. Presented to the Legislature 14th January, 1904. *Not printed.*

No. 48 . . Report of the Archivist, Ontario, for the year 1903. Presented to the Legislature, 14th April, 1904. *Printed.*

No. 49 . . Copy of an Order in Council advising that the tender of the Riordon Paper Mills, Limited, for the supply of Paper to the Province, for the ensuing five years, be accepted. Presented to the Legislature, 4th February, 1904. *Printed.*

No. 50 . . Copy of an Order in Council in accordance with the provisions of section 9 of the Act, respecting the Education Department. Presented to the Legislature, 4th February, 1904. *Not printed.*

No. 51 . . Copy of an Order in Council, advising that the Agreement for renewal of Contract between Warwick Brothers and Rutter, with reference to the Printing and Binding for the Province, be approved. Presented to the Legislature, 4th February, 1904. *Printed.*

No. 52 . . Copy of an Order in Council, respecting the commutation of the Surrogate Court Fees of the County of Huron. Presented to the Legislature, 8th February, 1904. *Not printed.*

No. 53 . . Copy of an Order in Council, respecting the commutation of Surrogate Court Fees of the County of Bruce. Presented to the Legislature 4th February, 1904. *Not printed.*

No. 54 . . Copy of an Order in Council, respecting the commutation of the Surrogate Court Fees of the Counties of York and Wentworth, Presented to the Legislature, 4th February, 1904. *Not printed.*

No. 55 . . Return to an Order of the House of the tenth day of June, 1903, for a Return of copies of all correspondence between the Government, or any member or department thereof, and any other person or persons, respecting the establishment of a Reformatory in the County of Oxford. Presented to the Legislature, 4th February, 1904. Mr. *Sutherland.* *Not printed.*

No. 56 . . Return to an Order of the House of the fourth day of June, 1903, for a Return of copies of all correspondence, papers, documents, decisions and memoranda in any way relating to the Mining Locations H.W.696, H.W.697, H.W.698 and H.W. 705, and particularly as to the southerly part of H.W. 697, containing thirteen acres, granted to one Gideon Larivière, which locations, are situate on, or near the North Pay of Sturgeon Lake in the District of Thunder Bay. Presented to the Legislature, 4th February, 1904. Mr. *St. John.* *Not printed.*

No. 57 . . Return to an Order of the House, of the twelfth day of June, 1903, for a Return,—similar to that ordered by the British House of Commons on the 25th day of June, 1902, of reproductive undertakings operated by Municipal Boroughs in Great Britain—respecting waterworks, electric lighting plants, gas works and other public utilities operated by Municipalities in the Province of Ontario, also the rates charged the consumers in the various Municipalities of the Province for water, gas and electric lighting. Presented to the Legislature, 4th February, 1904. Mr. *Preston (Brant).* *Printed.*

No. 58 . . Return to an Order of the House, of the fourth day of June, 1903, for a Return of copies of all correspondence between the Minister, or Commissioner of Public Works, or Fisheries, or other officer, or *employe*, of or under them, or either the Departments of Public Works, or Fisheries, and any other person or persons, and also any order or directions, or papers, or entries respecting the granting of licenses for pound net fishing east of a line running from Cape Hurd to the mouth of the Spanish River, during the years 1899, 1900, 1901 and 1902, or either or any of them. Also, copies of all such licenses granted during the above years, or either, or any of them. Presented to the Legislature, 4th February, 1904. Mr. *Smyth*. *Not printed.*

No. 59 . . Return to an Order of the House, of the 8th day of June, 1903, for a Return of all copies of all forms of application or subscription for terminating stock and of all forms of certificates of such stock used by Loan Corporations doing business in the Province. Presented to the Legislature, 4th February, 1904. Mr. *Downey*. *Not printed.*

No. 60 . . Return to an Order of the House, of the fourth day of June, 1903, for a Return of copies of all correspondence, between the Metropolitan Power Company, or their Solicitors, and the Government for a grant of land under the waters of the Ottawa River, and all papers in connection therewith. Presented to the Legislature, 4th February, 1904. Mr. *Matheson*. *Not printed.*

No. 61 . Copy of an Order in Council and Report of Registrar of Loan Corporations in the matter of the Canadian Co-operative Alliance. Presented to the Legislature, 5th February, 1904. *Not printed.*

No. 62 . . Copy of an Order in Council respecting Surrogate Court Fees to be paid to His Honour Judge Holt. Presented to the Legislature, 10th February, 1904. *Not printed.*

No. 63 . . Copy of an Order in Council respecting Surrogate Court Fees to be paid to His Honour Judge Jamieson. Presented to the Legislature, 10th February, 1904. *Not printed.*

No. 64 . . General Rules and Orders made by the Court of Appeal for Ontario respecting the trial of Election Petitions pursuant to the Controverted Elections Act, R.S.O., 1897, cap. 11, and amending Acts. Presented to the Legislature, 12th February, 1904. *Printed. For distribution only.*

No. 65 . . Return to an Order of the House, of the eighth day of February, 1904, for a Return shewing the names of all persons at Sault Ste, Marie, or elsewhere, who have been paid by the Government under the decision, or determination, to pay the wages of workmen at Sault Ste. Marie, and showing also the amount paid in each case and the nature of the claim in each case. Presented to the Legislature, 15th February, 1904. Mr. *Whitney*, *Printed.*

No. 66 . . Return to an Order of the House, of the tenth day of February, 1904 for a Return shewing the number of students admitted to (a) the Normal Schools of the Province since September, 1903. (b) How many (if any) of such students, prior to admission, taught less than twelve months in a Public School and (c) How many (if any) did not attend a Model School course and secured a certificate of competency therefrom. Presented to the Legislature, 16th February, 1904. Mr. *Hoyle*. *Not printed.*

No. 67.. Copy of an Order in Council, commuting the fees of F. H. MacDonald, Local Master at St. Catharines. Presented to the Legislature, 18th February, 1904. *Not printed.*

No. 68... Return to an Order of the House of the twenty sixth day of June, 1903, for a Return shewing:—1. The total area of Crown Lands under timber License. 2. The total area of Crown Lands under timber License in arrears. 3. The number of timber Licenses in arrear, their locations, respective areas, the names of those persons so in arrears, and the amounts that each of such persons are in arrear, and for what respectively. 4. The number of timber Licenses cancelled since and including 1891, and the number of acres of Licenses so cancelled. 5. The nature and extent of the securities (if any) held by the Government, for payment of such areas, and, the names of the persons so giving security. 6. The number of timber Limits disposed of otherwise than by Public Auction, since and including the year 1891, specifying the details thereof, as to time, place, person and prices respectively. 7. The number of pieces of saw-logs cut under License in the Province of Ontario, each year since and including 1891; the aggregate quantity of lumber, board measure, returned to the Crown Lands Department for each of the said years since and including 1891; the amount of Crown dues collected for each of the said years from the lumber cut, giving the quantity for each separate price charged for dues. 8. The number of pieces of waney or board timber cut under license in each of the said years and the aggregate quantity of cubic feet and the amount of Crown dues collected on the same. 9. The number of pieces of square timber cut and the quantity of cubic feet returned as contained in same and the amount collected for each of the said years thereon, for Crown dues. Presented to the Legislature 18th February, 1904, Mr. *St. John.* *Printed.*

No. 69.. Return to an Order of the House of the fifteenth day of February. 1904, for a Return of copies of all complaints received by the License Department against W. S. Cowan, formerly inspector of licenses for South Wellington; also, for a copy of the report of the investigation into such complaints, including the evidence; also, for a copy of the report of the Inspector who investigated the complaints, and also, for a copy of all correspondence touching the dismissal of the said W. S. Cowan. Presented to the Legislature, 22nd February, 1904. Mr. *Downey.* *Not printed.*

No. 70.. Return to an Order of the House of the nineteenth day of February, 1904, for a Return of copies of all correspondence between the Inspector of Prisons and Charities, or other official of the Government, and the County of Ontario, having reference to the salary of the County Gaoler. Presented to the Legislature 22nd February, 1904. Mr. *Hoyle.* *Not printed.*

No. 71.. Copy of Memorandum of Agreement between His Majesty, represented by the Commissioner of Crown Lands and Edward Wellington Backus, of the City of Minneapolis. Presented to the Legislature 23rd February, 1904. *Not printed.*

No. 72 . . Return to an Order of the House of the twelfth day of February, 1904 for a Return, shewing in the same detail as in the Public Accounts of the Province, all expenditures up to 31st December 1903, on account of the Temiskaming and Northern Ontario Railway, giving in detail the amount paid, to whom and on what account. And, in the case of the payments to the contractors for the building of the road—shewing all the quantities of rock and other material moved: masonry constructed and generally, all quantities on which payments are based, with the amount paid therefor upon each section of road. Presented to the Legislature, 29th February, 1904. Mr. *Matheson.* *Printed.*

No. 73 . . Return to an Order of the House of the nineteenth day of February 1904, for a Return of copies of all correspondence between the Government, or any officials thereof, and any person or persons, regarding the establishment of Savings Banks in connection with the Schools of the Province. Presented to the Legislature, 29th February, 1904. Mr. *Preston (Brant.)* *Not printed.*

No. 74 . . Return to an Address to His Honour the Lieutenant-Governor of the twenty-second day of February, 1904, praying that he will cause to be laid before this House, a Return of copies of all Orders in Council with reference to the payment of *employes* at Sault Ste. Marie, together with copies of all correspondence previous to, after and in any way relating to such payments. Presented to the Legislature, 1st March, 1904. Mr. *Whitney.* *Printed.*

No. 75 . . Return to an Order of the House of the twenty-sixth day of February, 1904, for a Return of copies of all correspondence with the Government, or other person, relating to the appointment of one Kelly, as constable, or peace officer, in and about Killarney, together with copies of all correspondence between the Government and one Charles Noble in connection therewith. Presented to the Legislature, 1st March, 1904. Mr. Gamey. *Not printed.*

No. 76 . . Return to an Order of the House of the twenty-fourth day of February, 1904, for a Return of copies of all correspondence, papers and pay sheets, between the Government, or any member or official thereof, in connection with the expenditure of all moneys expended last year, on Colonization Roads in the County of Addington. Presented to the Legislature, 1st March, 1904. Mr. Reid. *Not printed.*

No. 77 . . Return to an Order of the House of the twelfth day of February, 1904, for a Return of copies of all correspondence between the Government or any member, or official thereof, or persons on its behalf, and any other person or persons in connection with the appointment of William Coats, as Registrar of the County of Huron. Presented to the Legislature, 7th March, 1904. Mr. Eilber. *Not printed.*

No. 78 . . Statement of distribution of Revised and Sessional Statutes up to 31st December, 1903. Presented to the Legislature, 9th March, 1904. *Not printed.*

No. 79 .. Return to an Order of the House of the twenty-ninth day of February 1904, for a Return shewing: 1. The amount of money paid as, Railway Subsidies from 1867 up to and inclusive of 1903. 2. The name of each Railway and the amount paid as Subsidy thereto. 3. The amount of money voted for Railway Subsidies, but not yet earned. 4. The amounts in acres voted and set apart as Land Grants, during the same period. 5. The names of all Railways which have earned the apportionment of land so set apart. 6. The amount in process of being earned. Presented to the Legislature, 9th March, 1904. Mr. Preston, (Durham.) *Not printed.*

No. 80 .. Return to an Order of the House of the Seventh day of March, 1904, for a Return, shewing the number of Saloon Licenses in the different Cities of the Province during the years 1901 and 1903. Also, the number of Saloon Licenses in the Towns of the Province, during the same period. Also, the number of Wholesale Licenses granted in rural municipalities, in the Province, during the same, period. Presented to the Legislature, 10th March, 1904. Mr. *Barr. Not printed.*

No. 81 .. Return to an Order of the House of the Eleventh day of March, 1904 for a Return of copies of all correspondence, between the Government, or any official thereof, and the President of the Children's Aid Society of Brockville, or any other person or persons, in reference to the arrest and imprisonment of certain young lads in 1902, 1903 and 1904. Presented to the Legislature, 18th March, 1904. Mr. *Graham. Not printed.*

No. 82 .. Return to an Address to His Honour, the Lieutenant-Governor, of the fourth day of March, 1904, praying that he will cause to be laid before this House, a copy of all Orders-in-Council, authorizing or permitting an increase in the capital stock of the Peoples' Life Insurance Company, during the last two years, together with copies of all correspondence in any way relating thereto. Presented to the Legislature, 24th March, 1904. Mr. *Gamey. Not printed.*

No. 83 .. Return to an Order of the House, of the twenty-fifth day of March, 1904, for a Return shewing the names of all persons convicted for violation of any of the provisions of the Liquor License Act in the County of Carleton during the years 1901, 1902 and 1903, with the amounts of fines and costs imposed in each case respectively and showing, as well, the particular offence of which they were convicted and dates of conviction. Presented to the Legislature, 29th March, 1904. Mr. *Kidd. Not printed.*

No. 84 .. Return to an Order of the House, of the twenty-fifth day of March. 1904, for a Return, in detail of all payment made by the Commissioners of the Queen Victoria Niagara Falls Park, for the year 1903. Presented to the Legislature, 29th March, 1904. Mr. *Jessop. Not printed.*

No. 85 .. Return to Orders of the House, of the fourteenth, twenty-first (two orders), and twenty-fifth days of March, 1904, for Returns shewing :—

1. The names of the various companies included in the Consolidated Lake Superior Companies, which the Government proposes to aid by the $2,000,000 guarantee. 2. The names of the secured creditors of each company and the amount of the claim of each and the security held by each. 3. The names of the unsecured creditors of each company and the amount of claim of each. 4. Shewing what portion of the Algoma Central Railway is already completed, how much partly constructed and what construction work has been done on the part incomplete. 5. Shewing what portion of the road has been operated and what net earnings, if any, it has shewn. 6. The names of the vessels which it is proposed to give the Province as security, with statement shewing what these vessels have earned, net, in the hands of the Companies. Also, shewing full particulars of all claims, charges judgments and priorities chargeable against the Superior Consolidated Companies and the Algoma Central Railway; the names of all the creditors and the nature and amount of their respective claims, and particulars of all assets on which are based, and subject to which it is the intention of the Government to guarantee the sum of $2,000,000 to such companies as embodied in the Bill introduced to this House, before the second reading of such Bill. Also, shewing: 1. What lands and securities are governed by the Lien of Messieurs James Conmee, M.P.P., and Charles M Bowman, M.P.P., against the Algoma Central and Hudson Bay Railway Company, for upwards of $400,000, dated on or about the 22nd day of September, 1903 2. Whether the judgment of James Conmee, M.P.P., and Charles M. Bowman, M.P.P., against the Algoma Central and Hudson Bay Railway Company for upwards of $400,000, and dated on or about the 12th day of October, 1903, is still a charge on the assets of this company. 3. And shewing the amount of the said Judgment at the present time. And also, shewing the names of the allied industries referred to in section 1 of Bill (No. 129), Respecting Aid to the Algoma Central and Hudson Bay Railway. 2. A copy of the Mortgage referred to in subsection 1 of said section 1. 3. A copy of the Mortgage referred to in subsection 2 of said section 1. 4. A copy of the Promissory Note referred to in subsection 3 of said section 1. 5. A copy of the Stock Certificates of the Stock referred to in subsections 4 and 5 of said section 1. 6. A copy of the Trust Deed, or any draft thereof, referred to in section 2. 7. A copy of the Guaranty referred to in section 3. 8. Shewing what amount is referred to in subsection 3 of section 4. 9. How many Directors are provided for the re-organized Company. 10. A copy of the Deed, or any draft thereof, referred to in subsection 10 of section 4. 11 A copy of the plan of re-organization referred to in subsection 11 of section 4. Presented to the Legislature, 11th April, 1904. Messieurs *Hanna* and *Pyne*. *Printed.*

No. 86 . . Return to an Order of the House, of the sixteenth day of March, 1904, for a Return shewing the copyrighted selections and extracts from authors, used in the authorized text-books of the Public Schools, indicating in each case, the pages and the names of the persons or company controlling the copyrights. Presented to the Legislature, 7th April, 1904. Mr. *Nesbitt*. *Not printed.*

No. 87 . . Return to an Order of the House, of the second day of March, 1904, for a Return, shewing all payments under the San Jose Scale Act, as follows:—1st. Amount paid to the owners of trees destroyed. 2nd. Amount paid to officers of the Province for enforcing the Act, and 3rd. In what Counties the trees were destroyed. Presented to the Legislature, 7th April, 1904. Mr. *Lee. Not printed.*

No. 88 . . Return to an Order of the House of the fourteenth day of March, 1904, for a Return, giving copies of all correspondence between any person or official, on behalf of the University of Toronto and any member of the Government, with reference to the construction of a Physical Laboratory for the University. Also, copies of the Statute of the Senate of the University providing for the establishment of a Department of Forestry in the University, together with copies of all correspondence relating to the establishment of such Department. Presented to the Legislature, 7th April, 1904. Mr. *Whitney. Not printed.*

No. 89 . . Return to an Order of the House of the sixteenth day of March, 1904, for a Return of copies of all correspondence between the Government, or any Official thereof, and any person or persons, regarding the issue of licenses for the use of pound nets on Lake Nipissing. Presented to the Legislature, 8th April, 1904. Mr. *Little (Cardwell.) Not printed.*

No. 90 . . Return to an Order of the House of the Eleventh day of March, 1904, for a Return of copies of all correspondence between the Government, or any official thereof, and any other party or parties regarding the issue of pound-net fishing licenses in 1902 and 1903 in the waters between Killarney and Little Current, known as the North Channel. Presented to the Legislature 8th April, 1904. Mr. *Gamey. Not printed.*

No. 91 . . Return to an Order of the House of the sixteenth day of March, 1904, for a Return giving the names of Public School Inspectors since 1870, in Ontario. Also, the class of certificates they hold, or held, and shewing as well, the standing which each one obtained on their respective examinations entitling them to act as Inspectors of Public Schools. Presented to the Legislature, 20th April, 1904. Mr. *Gamey. Not printed.*

No. 92 . . Return to an Order of the House of the twenty-fifth day of March, 1904, for a Return of papers and all correspondence in connection with the issue of Patent for the south half of lot No. 8 in the 4th Concession of the Township of Hutton, in the District of Nipissing. Presented to the Legislature, 23rd April, 1904. Mr. *Matheson. Not printed.*

No. 93 . . Return to an Address to His Honour the Lieutenant-Governor of the twenty-second day of April, 1904, praying that he will cause to be laid before this House, a Return of a copy of the Judgment of the Judicial Committee of the Privy Council in the case of the Ontario Mining Company *et al., vs.* Seybold *et al.*, together with a copy of the agreement between Counsel for the Dominion of Canada and the Province of Ontario arising out of the argument of the said Appeal. Presented to the Legislature 23rd April, 1904. Mr. *Cameron (Huron.)* *Printed.*

No. 94 Return to an Address to His Honour the Lieutenant-Governor, of the twenty-second day of April, 1904, praying that he will cause to laid before the House, a Return of a copy of the Judgment of the Court of Appeal for Ontario, in answer to certain questions submitted, involving the validity of legislation by the Province respecting the profanation of the Lord's Day, and also the notes of argument and judgment of the Judicial Committee of the Privy Council upon the appeals thereto. Presented to the Legislature 23rd April, 1904. Mr. *Little (Norfolk.)* *Printed.*

TWENTY-FIFTH ANNUAL REPORT

OF THE

Ontario Agricultural and Experimental Union

1903.

(*PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.*)

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO.

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TORONTO.

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ONTARIO AGRICULTURAL AND EXPERIMENTAL UNION.

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The following list of members includes all of those who are or have been connected with the Agricultural College and have paid the annual membership fee for the present year. It is quite distinct from the list of cooperative experimenters, of whom there are now 3,945.

Name.	Address.
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Hopkins, Richard, Jr	Lindsay.

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Jacobs, W. S	Minesing.
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Lennox, W. J	Newton Robinson.
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Middleton, F	Clinton,
Middleton, J. R	Clinton.
Middleton, M. S	Vernon, B.C.
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Miller, T. E	Bridgeburg.
Miller, W. J	Castleton.
Mills, Dr. Jas	O. A. C., Guelph.
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Monteith, Nelson	Stratford.
Montgomery, C. G	New Richmond, Que.
Mooney, Jno	Valley River, Man.
Moorehouse, L. A	Stillwater, Okla.
More, Jas	Kirkton.
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Morse, T. B	Berwick, N.S.
Mortimer, R. E	Honeywood.
Morton, W	Bethany.

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Name.	Address.
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Muir, L	Port Elgin.
Muldrew, Dr. W. H	O. A. C, Guelph.
Mulloy, G. A	Aurora
Munroe, J. F	South End.
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Murray, J. R	Avening.
Murray, R. S	Toronto.
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O'Neil, Walter E	Picton.
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Pearce, W. C	Iona
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Peltzer, J	Adrogue, Argentina.
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Ransom, S	Guelph.
Ransom, F. T	Ransomville, N.Y.
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Shuh, C	Waterloo
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Simpson, L. D	Calgary, Alta.
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Squirrell, W. J	O. A. C., Guelph.
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Taylor, F	Cumberland Mills, Que.
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Thompson, H. H	Heathcote.
Thompson, Hugh	Magnetawan.
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Young, W. R	Cornwall.
Zavitz, C. A	O. A. C., Guelph.
Zavitz, Howard V	Coldstream.

THE ONTARIO
AGRICULTURAL AND EXPERIMENTAL UNION.

ANNUAL MEETING.

The twenty-fifth annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College, Guelph, on Monday and Tuesday, December 7th and 8th, 1903.

The President of the Union, Mr. Nelson Monteith, B.S.A., ex-M.P.P., Stratford, Ontario, presided over the three-day sessions, and Dr. James Mills, President of the College, over the public meeting on Monday evening, and at the annual supper on Tuesday evening.

SECRETARY'S REPORT.

By C. A. Zavitz, B.S.A., Agricultural College, Guelph, Ont.

The manuscript of the addresses, reports of co-operative experiments, and summaries of the discussions of the last annual meeting of the Experimental Union were carefully prepared for publication and forwarded to the Department of Agriculture, Toronto, Ontario, in January last. When printed, the report made a volume of eighty-seven pages. Some twenty-five thousand volumes were distributed among the farmers of Ontario in May and June. Although the results of the experimental work were brought to the homes of a very large number of the farmers of Ontario, it was unfortunate that the reports did not reach them at an earlier date, so that they could read the results of the experiments of 1902 before the commencement of the spring seeding of 1903.

The Board of Control appointed at the last annual meeting has met twice during the year—once in December, 1902, and once in September, 1903.

The co-operative experiments were conducted on more farms throughout Ontario in 1903 than in any previous year.

Four years ago the ex-students of the Ontario Agricultural College residing in the United States organized the "American-O.A.C. Union," and within the past year those residing in Manitoba, the Northwest Territories and British Columbia organized the "Western-O.A.C. Union." We are also pleased to note that similar organizations to the Ontario Agricultural and Experimental Union have been organized in at least five States of the American Union, namely, Ohio, Nebraska, Wisconsin, Illinois and New York, and that others are being organized in Kansas and Iowa.

Dr. A. C. True, Director of the Office of Experiment Stations in connection with the Department of Agriculture for the United States, wrote in 1898 as follows: "The work which the Union has undertaken is certainly a very important one. I believe your college has led the way in showing what ought to be done in all our States, and I hope your good example may soon be followed throughout the United States."

The Ontario Agricultural and Experimental Union has good ground for encouragement to move forward with its good work. We have great reason to believe that the co-operative work is extending in influence as well as in magnitude.

TREASURER'S REPORT, 1903.

By Prof H. L. Hutt, Guelph, Ont.

Receipts.		Expenditure.	
Balance from 1902	$ 187.29	Agricultural experiments	$1,078.48
Membership fees	156.00	Horticultural experiments	312.94
Government grant	1,500.00	Part expenses annual meeting, 1902, reporting, etc.	141.45
		Part expenses annual meeting, 1903	102.00
		Meeting of Executive	17.65
			$1,652.52
		Balance on hand	190.77
Total	$1,843.29		$1,843.29

We, the undersigned Auditors, declare that we have examined the accounts of the Treasurer, and found them correct.

M. CUMMING,
W. P. GAMBLE,

Dec. 1st, 1903.

PRESIDENT'S ADDRESS.

By Nelson Monteith, B.S.A., Stratford, Ont.

With the experiences and lessons of another year, we gather to this the twenty-fifth annual meeting of the Ontario Agricultural and Experimental Union. To you we extend a cordial welcome, and trust our meeting together may be mutually helpful.

No fewer than 3,845 experimenters throughout the Province have co-operated with us during the past year, which is a satisfactory evidence of the increasing confidence placed in our work by the agriculturists of Ontario.

The introduction of improved varieties of grain, roots, and fodders, through the agency of this Union, has done much to bring about the present vastly increased production of our farm products. The Mandscheuri barley, a variety imported by this College from Russia, and widely distributed throughout the Province of Ontario by our experimental tests, has proven an excellent yielder, and, in a measure, accounts for the present very large increase in barley production. Dawson's Golden Chaff among fall wheats, though not very popular with the millers, has proved a money-maker for the farmer. The Siberian oat, also a Russian importation, has proved a valuable addition to the most important of our cereal crops. Through the wide distribution of grains, roots corn and various fodder crops, properly named, growers have become familiar with the leading characteristics of the varieties that are best suited to their locality; hence the educational as well as the monetary value of our work. The horticultural branch of the Union's work has introduced choice varieties of small fruits into many sections, thus adding a new pleasure as well as profit to farm life. These are but a few of the many benefits that flow from our Union, now one of the senior organizations for the advancement of agriculture.

Progressive farmers are no longer selling grain as their finished product. Our very large exports of cheese, butter, beef, bacon and poultry are an evidence of their increasing skill. The prosperity of the farmers is reflected in our towns and cities by greater industrial activity, which is yearly drawing an ever-increasing number from our farms. To meet the changing conditions, many farms are being seeded down to be pastured with cattle for the production of beef. The introduction of improved machinery of larger capacity is also relieving the situation in a small measure. The condition of the farmer is not wholly satisfactory; in fact, it is unsatisfactory, except from a financial standpoint. The long hours of labor caused by the lack of help, both in the field and in the house, are causing many to lead lives of drudgery, and to neglect that social amity that should exist in well-ordered society.

The meeting of the Chambers of Commerce of the British Empire in Montreal, and the rapid filling up of our own great West have given increased prominence to our Dominion and its agricultural resources. The launching of the preferential trade proposals, now under discussion in the mother land, is an event of the past year that may have a most important bearing on agricultural methods of Ontario.

In recognition of the great importance of live stock and its allied industries to Ontario, you will note by our programme that prominence has been given to the stock feeds and to the feeding of live stock. It is fitting that we should discuss the best methods of using the grains, roots, and fodders made prominent by our co-operative experiments in field agriculture.

It is with pleasure I express, on behalf of our Union, our appreciation for this splendidly-appointed hall wherein to hold our meeting. This Massey Hall and the Macdonald Institute are most fitting tributes of their donors to the needs of scientific agriculture, and help to round off the necessary equipment of our Alma Mater. The ex-students and students of our College are taking a foremost place in the agricultural life and thought of our own Dominion, and also in that of the United States. We rejoice in this fact and are justly proud of it. But does our whole duty end here? Is it not time that the men of our College are entering more largely into the public life of this young and growing country?

As co-partner with our Union, The O. A. C. Review is doing splendid work in keeping alive a healthy college spirit amongst our ex-students, and it is with pleasure that we observe its widening influence from year to year.

Reports from the various committees will be presented for your consideration, to which we invite your most careful attention, not forgetting the time allotted by our programme for the discussion of each subject.

In conclusion, I have to thank you for the honor conferred upon me in my election to the Presidency of this Union during the past year. I am especially indebted to our Secretary, whose untiring efforts in behalf of the Union have rendered my duties largely honorary.

AN OFFICIAL ORGAN FOR THE UNION.

Mr. E. C. Drury, Crown Hill, said that the Union was doing good service in experimental work, but that it had a further duty to perform in creating a still more cordial feeling towards the College on the part of the farmers in general. There should also, he said, be a stronger feeling of union among ex-students of the College, and to this end he suggested making The O. A. C. Review the official organ of the Union.

This suggestion was generally approved and the following committee appointed to discuss the matter and place their report in the hands of the Secretary: T. G. Raynor, W. J. Brown, Prof. Hutt, R. J. Deachman, W. R. Dewar, and C. A. Zavitz.

Whereupon it was moved by Mr. W. J. Brown and seconded by Mr. W. R. Dewar, and carried unanimously, "That, in the opinion of the committee, The O. A. C. Review should be made the official organ of the Union, and that a Board of Editors be elected from the ex-students to co-operate with the present editorial staff, with the idea of bringing the paper more completely in harmony with the needs of the ex-students and experimenters, and that we recommend for their consideration the establishment of departments of the College paper to be devoted to the interests of the Union."

Moved by Mr. Elmer Lick, seconded by Mr. James Murray, "That the Board of Editors should be as follows: Professors Geo. E. Day and C. A. Zavitz, and Messrs. W. J. Brown, T. H. Mason, E. C. Drury, G. C. Creelman, N. Monteith." Carried.

A VOICE FROM NEW YORK STATE.

Prof. Gilmore, Cornell University: It is a great gratification to me to be here for the first time as representing the Experimenters' League of New York. This is the first year of our existence, and the league was organized so late in the spring that we have no tangible results to show for this season. We have an active membership of seventy, and the work is carried on by the ex-students of the College as well as by the farmers. We have three departments of work—horticulture, field crops and animal industry. We are looking forward to a large growth of interest, as well as to more diversified activities in experimenting. In reference to making The O. A. C. Review the organ of your league, I think it would be quite as beneficial to the farmers generally as to the members of the Union. The object of the publication similar to this one which we have begun is not only to benefit the Experimenters' League, but also to make the farmers generally acquainted with our work and with the facilities for experimenting which we offer them.

It is often asked, why is the farmer somewhat backward in comparison with the members of other callings? I suppose there are two general reasons. One is that the farmer has not had the teaching that he might have had in such a way as to make it beneficial to him. There seems to have been something wrong with our general educational system. We have adopted scientific ways in our educational system, and these, when taken to the farmer, are not adapted to the environment in which he lives. Matter regarding fattening of animals and the growing of the different crops must be adapted to the farmer in such a way as to be applicable to his environment.

The next point is that the farmer has to deal with things that are alive, and do not readily obey fixed laws. The mathematician deals with problems that obey fixed laws. The manufacturer knows that he can work according to certain formulas. In farming we have to deal with the life of the plant, the weather, and all the latent possibilities of the soil, which at present we understand very little about. The mere understanding of these things requires a great deal of time and energy. The primary or fundamental object of our work therefore should be to bring the instruction received at the Colleges to the men working on the farms, who have not the time or the energy to devote to such matters. If we can adapt our system of teaching to the environment of the farmer, we shall accomplish a very great purpose. We are endeavoring to develop our work along that line, and to enable students of the College of Agriculture to continue to be students after they return to the farm. There is a tendency, when our students return to the farm, to drift back into the old ways, which are not always the best ways.

CO-OPERATIVE EXPERIMENTS IN AGRICULTURE.

By C. A. Zavitz, Director of Experiments, Agricultural College, Guelph

As Director of the co-operative experiments in agriculture throughout Ontario, I submit the summary results of the reports of those experiments which were carefully conducted during the past year. As some persons may be unfamiliar with our system of co-operative experiments, I take the liberty of making some explanations regarding the work, which may add to the interest of the report which follows.

As many of you know, the Ontario Agricultural College and Experimental Farm was established in 1874 by the Government of the Province of Ontario. Experimental work was commenced in the spring of 1876, and has gradually increased in extent and in value from that day up to the present time. Experiments and investigations are now conducted at the college along different lines of practical and scientific agriculture. In the experiments with farm crops, upwards of 2,000 plots are used annually in growing grains, roots, potatoes, fodders, grasses, and clovers, to obtain information regarding the best varieties, the most productive selections of seed, the best dates of seeding, the most improved methods of cultivation, the most economical ways of increasing the fertility of the soil, etc.

In 1879 the officers, ex-students, and students of the Ontario Agricultural College formed themselves into an association under the name of the "Ontario Agricultural and Experimental Union." The objects of the association were: "To form a bond of union among the officers and students, past and present, of the Ontario Agricultural College and Experimental Farm; to promote their intercourse with the view to mutual information; to discuss subjects bearing on the wide field of agriculture, with its allied sciences and arts; to hear papers and addresses delivered by competent parties; and to meet at least once annually at the Ontario Agricultural College."

At the beginning of the year 1886, experiments had been carried on at the college for a period of ten years. The information thus obtained formed an excellent foundation for the establishment of a system of co-operative experiments among the farmers of Ontario. There was no way in which this could be brought about better than through the medium of the Experimental Union, which was comprised of energetic young men who had had the advantage of a training at an agricultural college, and had become familiar with accurate methods of conducting experimental work. A committee was, therefore, appointed by the Experimental Union to assist in getting a plan of co-operation established. The person now giving this report, who at that time had charge of the experiments in field agriculture and in live stock feeding at the college, was appointed Director of the co-operative experiments, in addition to his other duties. Letters were written to members of the Union, and twelve consented to conduct experiments with fertilizers and field crops on their own farms in the year 1886. The co-operative work started at that time has had a steady and substantial growth up to the present day. The increase in the number of experimenters in agriculture can be seen from the following figures, which show the exact numbers actually engaged in the work in each of several years: 1886, 12; 1887, 60; 1888, 90; 1891, 203: 1892, 754; 1894, 1,440; 1896, 2,425; 1901, 2,760; 1902, 3,135; and 1903, 3,345.

In the spring each year circulars, outlining the co-operative work, are distributed by the agricultural committee appointed by the Experimental Union. Those asked to take part in the scheme of co-operation may be classified as follows: (1) The officers and students, past and present, of the Ontario Agricultural College, who pay an annual fee of 50 cents, and have control of the executive work of the Experimental Union; (2) the experimenters of former years who have done satisfactory work; (3) leading farmers, gardeners and others, whose names have been suggested by secretaries of Farmers' Institutes, secretaries of agricultural societies, principals of collegiate institutes, inspectors of public schools, and others; and (4) various persons who have seen the experiments of other people, or have in some way heard of the work and wish to assist in the movement by conducting experiments on their own farms. The circulars are distributed in the order here given, starting first by sending to those who have been connected with the college, and are therefore trained for the work, and finishing the distribution by sending to those engaged in some branch of practical agriculture who have not conducted experiments previously, but who wish to undertake the work.

From the beginning, the co-operative experimental work of the Union has been directed and controlled by circulars and letters, printed and written, which have been transmitted through the mails. When personal visits have been made to the experimenters, the object has been to enable the director to study the difficulties of those actually engaged in the work, and thus to be in a better position to know the best methods to adopt in the printed instructions, rather than to take any part in the immediate control of the practical operations of the experiments.

Every man is made responsible for his own experiment, and is urged to do the very best he can for himself, for his neighbors, and for the Union. Many persons who at first took but little interest in the experiments have afterwards proven themselves to be most valuable experimenters, and have shown great care and accuracy in the details of their work. The names of those who conduct the experiments with the proper amount of care and accuracy are placed on the list of successful experimenters, and these individuals are carefully looked after in the future. It will, therefore, be seen that the Experimental Union makes a study of the men themselves, as well as of the products of their labor. The education of the men in the development of accurate methods, careful observation, and a deeper interest in the occupation of farming is one of the objects of the co-operative experimental work in Ontario. I have no hesitation in saying that the results which have been obtained along this line alone are of far greater value than the entire cost of the co-operative work of the past seventeen years.

No direct financial help is offered any person to undertake and carry through the co-operative work. It is purely a volunteer movement from the start to the finish. The materials for the experiments, the instructions for making the tests, and the blank forms for reporting the results are furnished free of charge to those who ask to join in the work, and who sign the agreement furnished by the Union. Experimenters in crop production use the soil on their own farms, conduct the experiments themselves, and report the results to the director of that particular branch of co-operative work in which they have enlisted. In those experiments in which crops are produced, the produce is retained by the experimenters as their personal property, except any small quantities which are returned to the college as samples.

The cost of the co-operative experiments is paid conjointly by the station and the Union. The station pays for most of the labor and for some of the material, and the Union for all of the stationery, printing, postage, expressage, etc., as well as for part of the material required to carry on the co-operative work.

In 1903 co-operative experiments in agriculture were conducted by the Union along thirty-four distinct lines of work. Of this number, thirty were with spring and four with autumn crops. They included grains, root crops, forage, fodder, silage and hay crops; culinary crops, methods of cultivation, preparation of seed, and application of commercial fertilizers and farmyard manures. The following is the list of co-operative experiments in agriculture conducted in 1903 by Ontario farmers, of whom there were 3,345 actually engaged in the work :

List of Experiments for 1903.

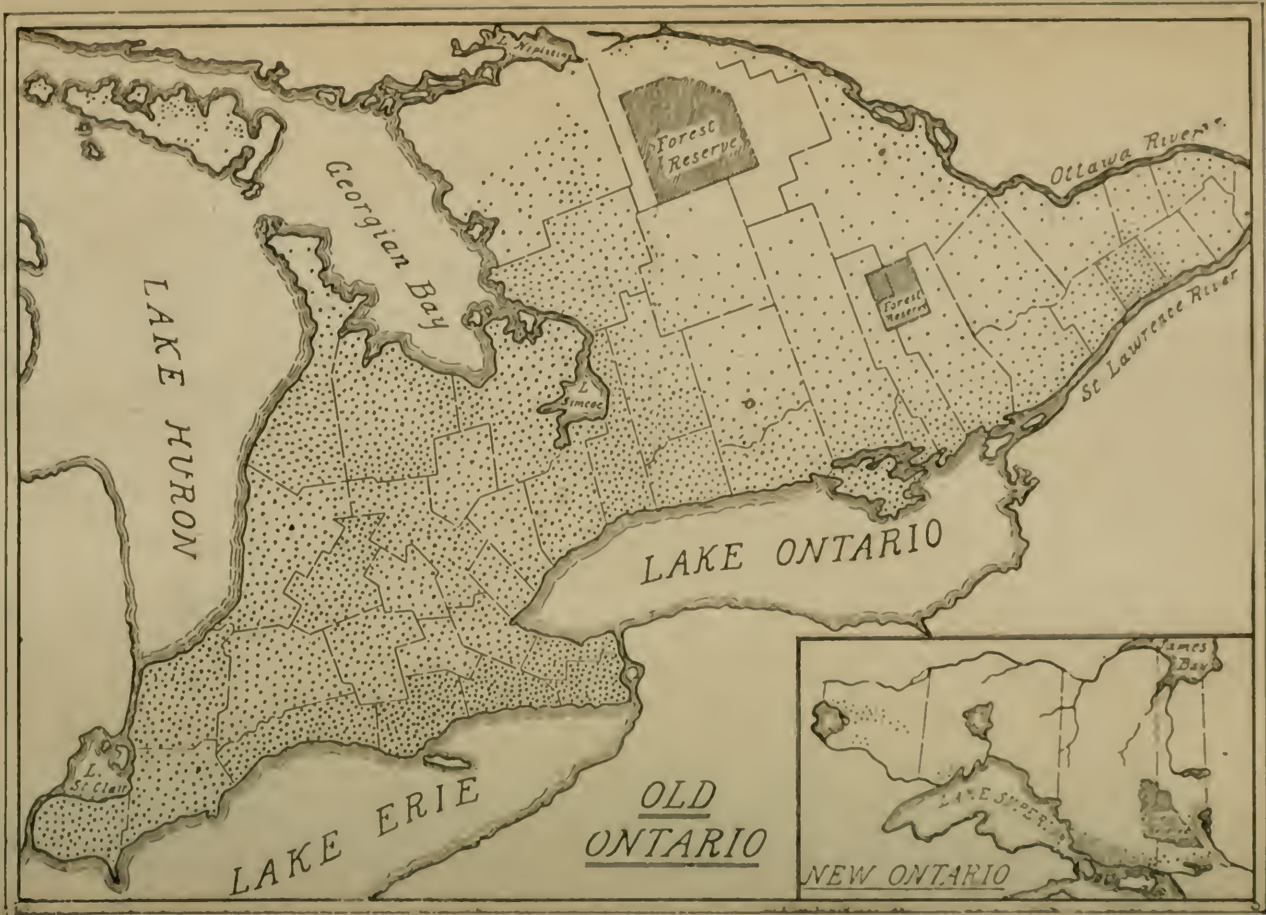
Grain Crops.	Plots.
1. Testing three varieties of Oats	3
2. Testing three varieties of six-rowed Barley	3
3. Testing two varieties of Hulless Barley	2
4. Testing Emmer (Spelt) and two varieties Spring Wheat	3
5. Testing two varieties of Buckwheat	2
6. Testing two varieties of Field Peas for Northern Ontario	2
7. Testing two varieties of bug-proof Field Peas	2
8. Testing Cow Peas and two varieties of Soy, Soja, or Japanese Beans	3
9. Testing three varieties of Husking Corn	3

Root Crops.	
10. Testing three varieties of Mangels	3
11. Testing two varieties of Sugar Beets for feeding purposes	2
12. Testing three varieties of Swedish Turnips	3
13. Testing Kohl Rabi and two varieties of Fall Turnips	3
14. Testing Parsnips and two varieties of Carrots	3
Forage, Fodder, Silage and Hay Crops.	
15. Testing three varieties of fodder or silage Corn	3
16. Testing three varieties of Millet	3
17. Testing three varieties of Sorghum	3
18. Testing Grass Peas and two varieties of Vetches	3
19. Testing two varieties of Rape	2
20. Testing three varieties of Clover	3
21. Testing Sainfoin, Lucerne, and Burnet	3
22. Testing five varieties of Grasses	5
Culinary Crops.	
23. Testing three varieties of Field Beans	3
24. Testing three varieties of Sweet Corn	3
Fertilizer Experiments.	
25. Testing fertilizers with Corn	6
26. Testing fertilizers with Swedish Turnips	6
Miscellaneous Experiments.	
27. Growing Potatoes on the level and in hills	2
28. Testing two varieties of Potatoes	2
29. Planting Cut Potatoes which have and which have not been coated with land plaster	2
30. Planting Corn in rows and in squares (an excellent variety of Early Corn will be used)	2
Autumn Sown Crops.	
31. Testing Hairy Vetches, Crimson Clover and Winter Rye as fodder crops	3
32. Testing three varieties of Red Winter Wheat	3
33. Testing five fertilizers with Winter Wheat	6
34. Testing autumn and spring applications of nitrate of soda and common salt with Winter Wheat	5

The most of the plots were one rod wide by two rods long, being exactly one-eightieth of an acre in size. The largest plots used in 1903 contained sixteen square rods, and were therefore one-tenth of an acre each. Formerly some of the plots were one-half of an acre in size, but these gave less satisfaction than the smaller ones.

The reports of the co-operative tests were very carefully examined, and those which were complete and which showed carefulness and reliability throughout were summarized. While these summaries should be of great value to the farmers generally, still those who conducted the experiments obtained much additional information regarding the results of their experiments as adapted to their individual circumstances, which it is impossible to convey in a concise report of this kind.

The experimenters deserve great credit for successfully conducting the various experiments during the past season, and the farmers owe much to these experimenters for the valuable reports which they furnished, the summaries of which are here presented.



Map Showing Co-operative Experiments in Ontario.
Each Dot Indicates a Co-operative Experiment in Field Agriculture in 1903.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN 1903.

The following are the average results of the cooperative experiments which were successfully conducted throughout the Province of Ontario within the past year:

The market value of field roots grown in Ontario last year amounted to upwards of $10,000,000. The growth of fodder crops in the Province is increasing year by year; the market value of fodder corn alone being something over $5,000,000 in 1902. The Bureau of Industries of Ontario does not place a market value on the pasture produced in Ontario, but we find that in 1902 there were nearly three million acres of pasture land. The market value of the hay crop for the same year was slightly over $40,000,000.

FIELD ROOTS AND FODDER CROPS.

Experiments.	Varieties.	Comparative value.	Yield per acre.
			tons.
Mangels (12 tests.	Sutton's Mammoth Long Red	73	43.68
	Yellow Leviathan	100	41.84
	Cornish Giant Yellow Globe	67	41.32
Sugar beets (12 tests).	New Danish Improved	100	27.02
	Kleinwanzlebener	50	22.31
Swede turnips (3 tests).	Magnum Bonum	100	26.01
	Kangaroo	67	25.16
	Hartley's Bronze Top	33	24.25
Parsnips and carrots (4 tests).	Pearce's Imp. Half Long White Carrot	100	27.70
	Improved Short White Carrot	82	24.52
	New Ideal Hollow Crown Parsnip	45	16.60
Fodder corn (2 tests).	Mastadon Dent	75	18.20
	Wisconsin's Earliest White Dent	100	16.48
	White Cap Yellow Dent	75	15.62
Millet (4 tests).	Hungarian	71	3.15
	Japanese Panicle	100	2.75
	Japanese Barnyard	86	3.51
Sorghum (1 test).	Early Amber Sugar Cane	100	18.25
	Kaffir Corn	72	12.10
	Millo Maize	46	8.55
Grass Peas and vetches (4 tests).	Common Vetches	100	9.47
	Hairy Vetches	80	8.16
	Grass Peas	90	7.62
Rape (2 tests).	Dwarf Bonanza	100	18.69
	Dwarf Essex	100	16.60

Mangels. Three varieties of mangels, namely, Sutton's Mammoth Long Red, Yellow Leviathan, and Cornish Giant Yellow Globe, were distributed for cooperative experiments in 1903. These represent three distinct classes, namely, the long, the intermediate, and the globe. Although the Sutton's Mammoth Long Red gave 61 bushels of roots per acre more than the Yellow Leviathan, the last named variety was considerably the most popular among the experimenters. This variety has given exceptionally isfactory varieties of mangels grown in Ontario at the present time. The seed was ob- high results in the experiments at the college, and, apparently, is one of the most sat- tained from D. M. Ferry, Windsor, Ontario. The Cornish Giant Yellow Globe gave a yield of 18 bushels per acre less than the Yellow Leviathan.

Sugar Beets for Feeding Purposes. Previous to 1900, one variety of sugar beets was included in the experiment with mangels, but it was thought advisable in 1900 to make a distinct experiment with sugar beets, and, therefore, two varieties from among some thirteen different kinds which had been tested at the Agricultural College were selected for the co-operative tests. For that year, the Danish Improved and the White Silesian were used, and the results showed that the yield per acre from the two varieties was practically the same, but the Danish Improved was more popular than the White Silesian in the estimation of the experimenters. In 1901, in 1902, and again in 1903, the Danish Improved and the Kleinwanzlebener were the two varieties included in the co-operative tests. The Kleinwanz'ebener is the variety which is perhaps used more extensively than any other variety for the production of sugar in America. According to analyses made at the College in 1901 and 1902, the Kleinwanzlebener gave an average of 16.9 per cent., and the Danish Improved, 11.4 per cent. of sugar. In the average yield per acre of the experiments conducted throughout Ontario, the Kleinwanzlebener was surpassed by the Danish Improved by 168 bushels in 1901, 140 bushels in 1902, and 157 bushe's of roots per acre in 1903. The two varieties used in the co-operative experiments were grown from an agricultural standpoint, and not from the standpoint of sugar production. The roots were grown in rows 25 inches apart, and the plants were thinned to a distance of 10 inches apart in the rows. As the Kleinwanzlebener gave an average of 22.3 tons per acre in 1901, 22 tons per acre in 1902, and 22.3 tons per acre in 1903, it will be seen that even this variety can be grown throughout Ontario to give comparatively high yields per acre.

Swede Turnips. The Sutton's Magnum Bonum, which is an English variety, has given very satisfactory results in the co-operative experiments throughout Ontario, occupying first place in yield of roots per acre in three out of the past four years. In 1903, not only did it give a larger yield per acre, but it was the most popular variety in the estimation of the experimenters. The Hartley's Bronze Top, a good old variety, was surpassed this year by the Sutton's Magnum Bonum variety by about 58 bushels per acre.

Fall Turnips and Kohl Rabi. Two varieties of fall turnips and one of Kohl Rabi were distributed in 1903 for cooperative experiments, but no satisfactory reports of carefully-conducted experiments with these roots have been received.

Field Carrots and Parsnips. In 1902, the Bruce's Mammoth Intermediate Carrot headed the list in yield of roots per acre. Seed of this variety was secured in the spring of 1903, but, owing to poor germination, it was not distributed. The Pearce's Improved Half Long White and the Improved Short White varieties were used for the co-operative experiments this year, the first named variety proving the best yielder and the most popular. The best variety of parsnips which had been grown at the college came far short of the best variety of carrots in yield of roots throughout Ontario in 1903.

Fodder Corn. The Mastadon Dent, Wisconsin Earliest White Dent, and White Cap Yellow Dent varieties of corn were used for testing on the farms of Ontario in 1903. For the production of fodder, the Wisconsin Earliest White Dent was the most popular among the experimenters. It, however, gave an average yield of 1¾ tons per acre less than the Mastadon Dent, and nearly one ton per acre more than the White Cap Yellow Dent. It is a variety which reaches about the right stage of maturity through the central part of Ontario for fodder or silage use, and it produces a very large yield of ears, thus making fodder or silage of excellent quality. The Mastadon Dent is considerably later, and the White Cap Yellow Dent fully as early as the Wisconsin Earliest White Dent.

Millet. The co-operative experiments show very peculiar results from the growing of millet in 1903. The Hungarian Grass has been surpassed by both Japanese varieties of millets in each of the four years previous to 1903. In the average results of the past five years, both Japanese varieties have given decidedly larger yields per acre than the Hungarian Grass. It will be noticed that the yields per acre of the millet in 1903 were exceedingly low, owing, no doubt, to the weather being unfavorable to the full development of this crop.

Sorghum. Only one good report on sorghum has been received this year. This indicates, as formerly, that the Early Amber Sugar Cane produced the greatest, and the Millo Maize the smallest yield per acre of the three varieties used in the co-operative tests.

Grass Peas and Vetches. Contrary to the results of each of the four years previous to 1903, the Hairy Vetches were surpassed in yield per acre by the Common Vetches in the tests of the past season. Usually the Hairy Vetches give higher yield per acre than either the Common Vetches or the Grass peas, but, owing to the peculiar weather conditions of the past season, the Hairy Vetches came second in yield of green crops per acre.

Rape. The Dwarf Bonanza Rape was distributed in 1903 for the first time, and the results of two tests show that it produced an average yield of about two tons per acre more than the Dwarf Essex variety.

Clover. As the average of nine tests of growing clover during the second year after seeding, the first cutting produced 4 tons per acre from the Mammoth Red, 2 3-5 tons per acre from the Alsike, and 2 1-10 tons per acre from the Common Red variety.

Lucerne, Sainfoin, and Burnet. As these crops usually remain in the land for a good many years, we hope to obtain some good results from these experiments in a few years' time. In the results so far, the Lucerne has given decidedly better results in yield per acre than either the Sainfoin or the Burnet.

Grasses. Some very interesting experiments with grasses are being conducted, but not many returns have yet been received after the grasses have become thoroughly established. We hope in the near future to be able to obtain some good information from this experiment. In the average of some eight tests of the second year's growth after seeding, it was found that the Tall Oat produced 2.7; Timothy, 2.6; Meadow Fescue, 2.1; and Orchard Grass, 1.9 tons of hay per acre.

Autumn Sowing of Winter Rye, Hairy Vetches, and Crimson Clover as Fodder Crops. An interesting co-operative experiment was made for the first time by sowing Winter Rye, Hairy Vetches, and Crimson Clover in the autumn for the purpose of producing green fodder in the following summer. The reports show that the Crimson Clover received the greatest injury from the early spring frosts. The highest individual yields were produced by the Hairy Vetches. In the average results, however, the Winter Rye surpassed the Hairy Vetches by 420 pounds of green fodder per acre, but the quality of the feed of the latter was superior to that of the former. In ten out of a dozen tests, the Hairy Vetches were eaten readily by farm animals, and seemed particularly suitable as a feed for hogs. A Bruce farmer reported that "the Hairy Vetches gave a large yield, and were relished by all classes of animals."

METHODS OF PLANTING CORN.

For four years an experiment has been conducted throughout Ontario in planting corn in squares, or hills, in comparison with planting corn in rows, or drills. The same amount of seed was used in both cases. The rows were three feet apart, and the grains of corn nine inches apart in the rows, and the hills three feet apart each way, having four kernels in each hill. Each plot was four rods square, thus containing sixteen square rods, or one-tenth of an acre. In every year that the experiment has been conducted, the average results have been somewhat in favor of planting in squares, or hills;

although the difference in 1903 was very slight. In the average of the four years, the corn planted in squares, or hills, yielded 11 tons of whole crop and 2.9 tons of husked ears per acre and the corn planted in rows, or drills, yielded 10 tons of whole crop and 2.7 tons of husked ears per acre, thus showing a difference of 1 ton of whole crop and 1-5 of a ton of husked ears per acre in favor of planting corn in squares so that it could be cultivated in two directions instead of one.

Experiments with Fertilizers on Farm Crops

Within the past twelve years a considerable amount of work has been done in testing a few characteristic fertilizers with some of the principal farm crops grown in Ontario. Both the fertilizers and the seeds were sent from the College to the experimenters in each of the years. In every instance, the nitrate of soda and the muriate of potash were applied at the rate of one hundred and sixty pounds per acre, and the superphosphate at the rate of three hundred and twenty pounds per acre. The mixture, or complete fertilizer, was composed of one-third of the amount of these fertilizers, making in all two hundred and thirteen and one-third pounds. In all cases, the nitrate of soda was applied when the plants were about two inches in height, and the muriate of potash and superphosphate at the time of sowing the seed. The cost price of each of the fertilizers amounted to about $4.60 per acre. Farmyard manure has only been used in the experiments of the past two years. The advice to each experimenter was to apply five hundred pounds of average cow manure per plot, the application being equal to twenty tons per acre. The cow manure was mixed with the soil to a depth of from four to five inches, and the fertilizers were stirred into the soil to a depth of from one to two inches.

Fertilizer Experiments.—Oats, Mangels, Fodder Corn and Swede Turnips.

Kind of fertilizer used.	Fertilizer per acre.	Average yield per acre.					
				Fodder corn.		Swede turnips.	
		Oats 5 yrs. 74 tests.	Mangels 5 yrs. 41 tests.	Whole crop. 6 yrs. 43 tests.	Husked ears. 6 yrs. 38 tests.	2 yrs. 5 tests.	1903. 3 tests.
	lbs.	bus.	tons.	tons.	tons.	tons.	tons.
Nothing	....	38.9	20.6	8.2	2.8	24.1	25.5
Nitrate of soda	160	46.3	26.5	9 7	3.2	28 9	32.1
Muriate of potash	160	43.8	24.6	9.8	3 1	28.6	39 9
Superphosphate	320	43.6	24.2	9.4	3.2	30.3	33.6
Complete fertilizer	213	48 7	25.4	9.6	3.3	32.1	34 9
Cow manure	40,000	....	....	....	....	33.5	38 1

Experiments have now been conducted throughout Ontario by applying fertilizers to oats for five years, to mangels for five years to fodder corn for six years, and to Swede turnips for two years. The results for 1903 are confined to the experiments with fertilizers on Swede turnips.

In the average of experiments in applying fertilizers to Swede turnips in 1902 and 1903, the results show the number of bushels of turnips from each application of fertilizer to be as follows: Farmyard manure, 33.9 tons; complete fertilizer, 32.1 tons; superphosphate, 30.3 tons; nitrate of soda, 28.9 tons; and muriate of potash, 28.6 tons. The unfertilized plot gave an average of 24.1 tons of roots per acre. Of the different commercial fertilizers used, the mixed fertilizers, therefore, gave the largest yield per acre, the increase over the unfertilized plot being 267 bushels per acre. This increase was produced at a cost of about 1.7 cents per bushel.

During the six years in which the fertilizers were applied to fodder corn, forty-three complete and satisfactory reports were received. The unfertilized land gave the lowest yield per acre in each of the years, and the muriate of potash produced the highest yield in five out of the six years during which time this test was made. An application of one hundred and sixty pounds of muriate of potash per acre increased the yield of the corn 1.6 tons. This was accomplished at a cost of about $2.87 per ton for the fertilizer used.

During the five years in which fertilizers were used with mangels, forty-one good reports of successfully-conducted experiments were received. These show that the smallest average yield was produced from the unfertilized plot, namely, 20.6 tons per acre, and that the largest average yield was produced from the nitrate of soda, namely, 26.5 tons per acre. As in the case with corn, the unfertilized land gave the lowest yield in each year. The nitrate of soda produced the highest yield in four out of the five years. The average of 197 bushels of mangels per acre produced by the nitrate of soda over the unfertilized land was obtained at a cost of about 2.3 cents per bushel. The nitrate of soda produced the largest yield on both heavy and light soils, but on the black loams the muriate of potash gave the highest yield of mangels. The nitrate of soda showed the greatest influence upon the light soils, as in the average of fifteen experiments, the land which was fertilized at the rate of one hundred and sixty pounds of nitrate of soda per acre gave an average yield of 7 2-3 tons per acre more than the land which was unfertilized.

Seventy-four good reports of successfully-conducted experiments in applying fertilizers to oats were received during the five years in which this experiment was conducted over Ontario. The lowest yield was obtained from the unfertilized land, viz., 38.9 bushels per acre; and the highest average yield from the complete fertilizer, 48.7 bushels; and the nitrate of soda, 46.3 bushels per acre. The unfertilized land produced the lowest yield per acre in each of the five years. The mixed, or complete fertilizer, gave the largest yield of oats per acre in the average results of this experiment for each of the years in which it was conducted. Although the land which received the mixed fertilizer gave an average of 9.8 bushels of oats per acre more than the unfertilized land, still this increase was produced at a cost of about 47 cents per bushel. The mixed fertilizer gave a larger average yield than no fertilizer on heavy soils by 12.7 bushels per acre, on light soils by 10.2 bushels per acre, and on black, mucky soils by 7.1 bushels per acre.

Fertilizers With Winter Wheat. In the co-operative experiments with different manures applied in the spring of 1903, the average results show a yield of 29.7 bushels of winter wheat from an application of one hundred and sixty pounds of nitrate of soda per acre, and 35.7 bushels from a top dressing of twenty tons of well-rotted cow manure per acre. The unfertilized land gave an average yield per acre of 22.7 bushels. The yield of wheat from one hundred and sixty pounds of nitrate of soda surpassed the yield from four hundred pounds of common salt by 3.5 bushels per acre. Nitrate of soda, when applied in the spring, gave better results than when applied in the autumn.

Each experimenter was asked to give the relative value of each variety as the result of the experiment conducted on his own farm. In the first column of figures, therefore, in the table here presented, the highest results of the comparative value of the different varieties are given—100 representing the most popular variety in each experiment. The yield of straw as here reported means the total crop, less the amount of grain, and this would, of course, include the chaff with the straw.

GRAIN CROPS.

Experiments.	Varieties.	Comparative value.	Yield per acre.		
			Straw.	Grain.	Grain.
			tons.	lbs.	bus.
Oats (104 tests).	Siberian	96	1.63	1,854	54.54
	Liberty	100	1.56	1,850	54.40
	Alaska	62	1.36	1,617	47.55
Six-rowed barley (32 tests).	Mandscheuri	100	1.59	2,158	44.95
	Oderbrucker	64	1.53	1,941	40.50
	Success	55	1.08	1,324	27.59
Hulless barley (18 tests)	Black Hulless	100	1.46	1,448	24.13
	White Hulless	65	1.51	1,248	20.80
Spring wheat (13 tests).	Emmer	100	1.55	1,810	45.25
	Wild Goose	79	1.33	1,078	17.97
	Red Fife	68	1.53	1,062	17.69
Buckwheat (2 tests).	Silver Hull	100	2.00	1,580	32.92
	Japanese	67	2.00	1,000	20.83
Field peas (14 tests).	Early Britain	100	1.65	1,955	32.59
	Canadian Beauty	90	1.73	1,560	26.00
Field beans (8 tests).	White Wonder	100	1.68	1,775	29.59
	Marrowfat	64	2.08	1,655	27.59
Bug-proof peas (20 tests).	Egyptian	93	1.03	976	16.27
	Grass	100	1.72	827	13.79
Soy beans (3 tests).	Early Yellow	100	1.28	906	15.11
	Medium Green	67	1.69	766	12.77
			Whole crop,		
Corn for grain (16 tests).	King Phillip	100	7.97	2,706	48.31
	North Star Yellow Dent	68	9.63	2,631	46.99
	Compton's Early	83	7.52	2,572	45.93
			Straw.		
Winter wheat (25 tests).	Imperial Amber	100	1.61	1,496	24.93
	Buda Pesth	58	1.30	1,281	21.35
	Turkey Red	63	1.48	1,243	20.72

Oats. In 1903 three varieties of oats were carefully and successfully tested on each of one hundred and four Ontario farms. The average results show that the Siberian variety heads the list, with an average of 54.5 bushels per acre. This variety, however, is closely followed by the Liberty, which yielded 54.4 bushels per acre. The Siberian oats have been grown in the co-operative experiments throughout Ontario in each of the past twelve years, the average yield per acre per annum for that period being 52.5 bushels per acre. The yield of the Siberian in 1903, therefore, was two bushels per acre more than the average yield for the past 12 years. The average yield of oats per acre throughout Ontario for the last twenty years has been 35.3 bushels per acre, or 17.2 bushels per acre less than the average of the Siberian variety in the co-operative experiments for the past twelve years. The Liberty oats were distributed in 1903 for the first time. This variety has given an average of 5.6 bushels per acre less than the Siberian in the average results of the tests made at the college for the past four years. It is an oat with a medium length of straw, spreading head, and white grain. According to the reports of the experimenters in 1903, it was about the same as the Siberian in both strength of straw and amount of rust. The Alaska variety is very early and seems well adapted for growing in the northern part of Ontario as a single crop, and in the southern part of the Province, when mixed with Mandscheuri. Common Six-rowed, or other varieties of barley which ripen about the same time as these. The percentage of hull on the grain is exceedingly small, being only 25.3 as the average of the past two years, while that of the Siberian was 29.3, and that of the Liberty 31.1.

Barley. In the average results of thirty-two tests with barley, the Mandscheuri comes first, with 45 bushels, the Oderbrucker second, with 40.5 bushels, and the Success third, with 27.6 bushels of grain per acre. These are all six-rowed varieties, the first two having beards, and the last being beardless. The Mandscheuri was decidedly the most popular variety among the experimenters in 1903. There is perhaps no barley in Ontario at the present time which will give as great a yield as the Mandscheuri when grown throughout a series of years. The straw of this variety is of good length, and the crop usually stands well. Its weight per measured bushel is usually a little more than 50 pounds.

Hulless Barley. Much has been said of late in reference to the growing of Hulless barley in Ontario. Some fourteen varieties have been grown in the trial grounds at Guelph. In the co-operative experiments throughout Ontario in 1903, the Black Hulless gave a yield of 24.1, and the White Hulless of 20.8 bushels of grain per acre in the average of the tests made on eighteen different farms. The Black Hulless, although slightly weaker in the straw than the White Hulless variety, was decidedly the most popular among the experimenters. There was practically no rust on either variety in 1903. In the average results of these two varieties for eight years, the Black Hulless surpassed the White Hulless variety by 6.3 bushels per acre.

Spring Wheat. Three varieties of spring wheat, each representing distinct types, were distributed for co-operative experiments in 1903. The Red Fife is used principally for the production of flour, the Wild Goose for the production of macaroni, and the Emmer (improperly called Spelt) for the production of feed for farm stock. In the average of thirteen experiments in 1903, the Emmer surpassed the Wild Goose spring wheat by an average of 732 pounds, and the Red Fife by an average of 748 pounds per acre. The Emmer, which frequently goes under the name of Spelt or Speltz in this country, also surpassed the Wild Goose spring wheat in the average results of thirty-nine tests in 1901 by 450 pounds per acre, and of thirty-one tests in 1902 by 724 pounds per acre. In threshing the Emmer, the heads break up into sections, and there is only a partial separation of chaff and kernel. The threshed grain, therefore, contains an average of about 23 per cent. of chaff. The amount of chaff, or hull, on the Emmer is, therefore, rather less than the hull of oats. The Emmer has given very large yields of grain in the experiments at the college. Of recent years the Wild Goose spring wheat has been grown largely for export to France and Italy for the manufacture of macaroni, and the price of this variety has been higher than formerly, when it was manufactured into flour in Ontario. The Red Fife is a grain of excellent milling quality, and is one of the best varieties of spring wheat that is grown in Ontario for the production of flour.

Buckwheat. The summary report of experiments on buckwheat is a very weak one, as there were only two good reports received this season. The Silver Hull variety gave a larger yield than the Japanese in each of the two experiments. These two varieties have been tested throughout Ontario in each of the past seven years, and this is only the second time in which the Silver Hull has given a larger yield of grain than the Japanese variety.

Field Peas. Four varieties of peas were used in the cooperative experiments for 1903. These were divided into two distinct experiments—one being with large yielding varieties which are subject to the attacks of the pea weevil (pea bug), and the other with varieties which are entirely proof against the ravages of the weevil. The two varieties of peas—Early Britain and Canadian Beauty—were distributed in those districts of Ontario which are as yet uninfested with the pea weevil. The average results of the fourteen tests show that the Early Britain gave 6 3-5 bushels per acre more than the Canadian Beauty variety. This is the second year that these two varieties have been in competition throughout Ontario. Although the difference between the two varieties was not as marked in 1902 as in the present year, still the Early Britain produced the greatest yield of grain. The Early Britain is a brown pea, imported from England. It is a good pea for feeding, but not as saleable a variety as the Canadian Beauty, the latter named variety being a large, smooth, white pea of good quality, and generally commanding a good price.

For the experiment with peas which are proof against the pea weevil, the Egyptian and Grass varieties were used. As in 1902, the past season was unfavorable for the growth of these two varieties, the yields being as follows: Egyptian, 16.3, and the Grass 13.8 bushels per acre. In each of the past three years the Egyptian peas have given a larger yield of grain per acre than the Grass peas. The latter named variety possesses a straw of medium length and of good quality, and grain, which, when ground, makes a rich meal for feeding to farm stock. The Egyptian pea requires very rich soil. It produces a poor quality of straw, but generally a large yield of grain, which is of good quality. In some localities there appears to be a blight, which has considerably injured the Egyptian peas in each of the past two years.

Field Beans. The White Wonder variety of field beans, which has given the largest yield per acre of all the varieties grown at the college in the average of several years' experiments, also gave the largest yield per acre of the two varieties tested throughout Ontario in 1903. In the average of the good reports received from eight farms throughout Ontario, the White Wonder gave 29.6, and the Marrowfat, 27.0 bushels per acre. The White Wonder was the most popular variety among the experimenters. It is a small, white bean, of good quality, very prolific, and quite early in reaching maturity. The Marrowfat beans are large in size, but, as a rule, not as prolific as the White Wonder variety.

Soy Beans. The Soy beans are also known under the names of Soja, or Japanese, beans. It is a leguminous plant grown quite extensively in Japan and China, and is exceedingly rich in valuable food constituents. The plants grow upright, branch considerably, and frequently drop their leaves about the time the seed is ripe. The Soy beans are used for green fodder, silage, hay, pasture, and as a soil renovator. The grain, which is exceedingly rich, is used as a food for live stock. The beans are not generally used as a food for man when cooked by themselves, but are made into different complex forms, of which five are quite common among the Japanese people.

The Medium Green and the Early Yellow varieties of Soy beans were distributed throughout Ontario in 1903 for cooperative experiments. The Medium Green variety has been used for this purpose for five years in succession, the average yield being 20.5 bushels per acre. The Early Yellow variety has been grown in the co-operative experiments for three years in succession, producing an average yield of 17.0 bushels per acre. In 1903, however, the Early Yellow gave 2.3 bushels per acre more than the Mdeuim Green variety. The yield in each case was unusually small, owing probably to the unfavorable weather conditions of the past season in many parts of the Province. The Early Yellow is considerably earlier in maturing than the Medium Green variety. Usually, therefore, the Early Yellow is likely to give the better results for grain production, and the Medium Green variety for the production of fodder.

Corn for Grain. In 1901 and again in 1903, the North Star Yellow Dent, Compton's Early, and King Phillip varieties of corn were distributed throughout Ontario for cooperative experiments. In each of these years the Compton's Early produced the lightest yield per acre. In 1901, the North Star Yellow Dent gave 2.1 bushels per acre more than the King Phillip, but in 1903 the King Phillip surpassed the North Star Yellow Dent by 1.3 bushels per acre. According to the reports of the experimenters in 1903, the average height obtained by the different varieties was as follows: Compton's Early, 72 ins.; King Phillip, 73 ins.; and North Star Yellow Dent, 93 ins. On examination by the experimenters at the time when the corn was harvested, it was found that on the average the grain of the King Phillip was ripe, that of the Compton's Early was in the firm dough, and that of the North Star Yellow Dent was in the dough condition. It is evident that, while the North Star Yellow Dent is a good yielder of grain and produces a considerably larger total yield per acre than either the King Phillip or the Compton's Early varieties, it cannot be grown quite as far north as either of the latter named varieties.

Winter Wheat. Three varieties of winter wheat were distributed throughout Ontario in the autumn of 1902 for co-operative experiments. Good reports of successfully-conducted experiments were received this year from eighteen counties, extending from Essex in the south to Haliburton in the north. The Imperial Amber gave the largest yield of wheat in the co-operative experiments throughout Ontario, the average being 24.9 bushels. The Buda Pesth comes second with 3½ bushels per acre less, and the Turkey Red third, with 4.2 bushels per acre less than the Imperial Amber. All three varieties are bearded. The chaff of the Imperial Amber is red, and that of the others is white. The grain of each variety is red, hard, and recommended for the production of flour of good quality. All three varieties are rather weak in the straw. In the experiments at the college, the Imperial Amber has proven to be a close rival to the Dawson's Golden Chaff in yield of grain. The results of the co-operative experiments with winter wheat were reported as soon as possible after the crop was harvested, the report being sent to many of the experimenters throughout the Province.

EXPERIMENTS WITH SWEET CORN.

It need scarcely be mentioned that farmers, as a rule, do not take the fullest advantage of growing the best varieties of sweet corn for table use. By planting an early, a medium, and a late variety of sweet corn in the garden, the family can be furnished with green corn for the table for a long season. In order to encourage a more general cultivation of some of the best varieties of sweet corn, three kinds were distributed throughout Ontario in 1903.

The results of the successfully conducted experiments throughout Ontario show that in 1903 the varieties were ready for table use as follows: Mammoth White Cory, 95 days; Crosby, 111 days; and Country Gentleman, 125 days; or a period of one month from the time that the earliest until the latest variety was ready for use. The Crosby produced the greatest number of ears, but this was closely followed by the White Cory variety. The Country Gentleman yielded about three-quarters the number of ears that were produced by the Crosby. In table quality, all proved good, but the Crosby appeared to be the favorite. The Country Gentleman was rather weaker in growth this year than usual. On the whole, the Crosby was the most popular variety among the experimenters.

EXPERIMENTS WITH POTATOES.

About 160,000 acres are devoted to the growing of potatoes in Ontario each year. The annual average yield is about 18,000,000 bushels; in market value, about $7,000,000. According to the report of the Bureau of Industries, the average yield of potatoes per acre throughout Ontario for the past twenty years has been 115 bushels. Three distinct experiments with potatoes were conducted in 1903, one with varieties, one in preparation of seed, and one in methods of cultivation.

POTATO EXPERIMENTS.

Experiment.	Potatoes.	Comparative value.	Per cent. small potatoes.	Mealiness when cooked.	Yield of whole crop per acre.
					bus.
Potatoes (227 tests).	Empire State	100	9	100	221.9
	Burpee's Extra Early	75	13	98	172.6
	Early Pinkeye	69	11	87	164.1
	Early Ohio	51	16	80	125.2
	Stray Beauty	36	22	53	118.8
				Average yield 3 years.	
Methods of cultivation. (36 tests).	Grown on the level	84	10	208.2	229.7
	Grown in hills.	100	8	205.9	236.1
				Average yield 4 years.	
Preparation of seed (16 tests).	Potatoes not coated with land plaster	81	16	168.7	176.2
	Potatoes coated with land plaster	100	15	177.6	181.4

Varieties of Potatoes. Five varieties of potatoes were distributed for co-operative experiments in 1903. Only two varieties were sent to each experimenter, but they were distributed in such a way that the summary results can be so arranged as to represent the comparative yields per acre, all reckoned on a uniform basis. One late, one medium, and three very early varieties of potatoes were used for the cooperative tests. The average yields per acre of the two hundred and twenty-seven successfully conducted experiments are as follows: Empire State, 222 bushels; Burpee's Extra Early, 173 bushels; Early Pinkeye, 164 bushels; Early Ohio, 125 bushels; and Stray Beauty, 119 bushels. The late variety, therefore, gave the largest yield per acre, and the medium variety the second largest. Of the three early varieties, the Early Pinkeye gave decidedly the largest yield per acre. In per cent. of small potatoes, the Empire State produced nine, and the Early Pinkeye, eleven; the Early Ohio produced sixteen, and the Stray Beauty, twenty-two. The percentage of small potatoes in the Stray Beauty was, therefore, double that of the Early Pinkeye variety, and both of these are very early varieties. In mealiness of the cooked potatoes, the Early Pinkeye stood the highest, and the Stray Beauty the lowest of the early varieties. On the whole, the Empire State was the most popular of the lot. Of the very early varieties, the Early Pinkeye was the most popular, and the Stray Beauty the least popular among the experimenters.

Methods of Cultivating Potatoes. For three years in succession, potatoes have been distributed throughout Ontario and instructions given for carrying on a careful experiment in comparing the practice of "hilling up" potatoes as against growing them on the level. The results for 1903 are somewhat in favor of "hilling up" the potatoes, probably due to the peculiar season. In each of the two years previous the results were in favor of level cultivation. Taking the average of three years, during which time exactly one hundred successfully conducted experiments have been reported, we find that the potatoes which were grown on the level gave 208.2 bushels, and those which were "hilled up" gave an average of 205.9 bushels per acre, or about 2 1-3 bushels per acre in favor of the level cultivation.

Preparation of Seed Potatoes. In experiments conducted at the college in cutting potatoes and planting the pieces after they had been sprinkled with lime, plaster, etc., in comparison with planting the pieces without being sprinkled with any material, it was found that those potatoes which were sprinkled with land plaster gave better results than the potatoes prepared in any other way. For four years an experiment has been conducted throughout Ontario in order to let farmers ascertain for themselves whether there would be any marked advantage from using land plaster on their seed potatoes before planting. In 1903, as in 1900 and 1901, the land plaster showed a marked advantage. In 1902, however, the results from the two methods were very similar, showing a slight advantage where no land plaster was used. In the average of the four years, in which there were in all exactly eighty successfully-conducted experiments, we find that the potatoes which were not coated with land plaster produced 168.7 bushels, and those which were coated with land plaster produced 177.6 bushels per acre. In the average results of four years, therefore, the sprinkling of seed potatoes with land plaster or gypsum increased the yield by about 9 bushels per acre throughout Ontario.

Mr. W. J. Brown: Can you give me the feeding values of the different varieties of mangels?

Mr. Zavitz: The results of analyses made by Prof. Shuttleworth showed that the Globe varieties were slightly the richest; next came the Intermediate, and last the Long Red; but there was not much difference in the composition of the three classes. I think that Prof. Shutt of Ottawa found that some of the larger varieties of roots gave as good results as some of the smaller varieties of roots.

Q.: Where do you classify the Giant Sugar mangel?

Mr. Zavitz: It seems to resemble a beet rather more than a mangel.

Mr. T. H. Mason: In southern Ontario, we find that the parsnip increases very materially in weight by being left in the ground over winter. In some cases they were fed to hogs in the spring.

Mr. James McCabe: Would it not be well to sow them in the fall? Parsnips sown in the fall have given good results in our neighborhood, and made an earlier start than if sown in the spring.

Mr. Zavitz: It is often very difficult to get a good stand in the spring, owing to the lack of germination. The autumn sowing would likely furnish the most uniform stand of plants.

Q.: Do you have any trouble with the Japanese Panicle Millet shedding its seed before it is ready for harvesting?

Mr. Zavitz: When grown for seed, it does sometimes do so.

Q.: A great many of the varieties have this habit.

Mr. Zavitz: The Japanese Panicle variety is not so bad as some others in this respect.

Mr. N. Monteith: The Wisconsin Earliest White Dent corn has shown itself to be one of the biggest croppers we could get in the Stratford district.

Mr. T. H. Mason: We have grown it extensively for some years. It is one of the most satisfactory varieties we have ever grown there. It will give a large yield of helled corn per acre, and will mature almost any year; that is in East Elgin, and on he lightest soil. We find it resists drouth, and is better for our light lands than the lint varieties.

Q.: Have you any data as to the value of sowing the Hairy Vetch in the spring?

Mr. Zavitz: We have had better results from sowing in the autumn. It goes hrough the winter well and gives better results the next year than when sown in the pring. We distributed Hairy Vetch seed throughout the Province in the autumn of last ear, and the results have been very satisfactory.

Q.: For the cultivation of seed, should it be sown in the autumn?

Mr. Zavitz: The yield of seed is about twice as great when sown in the autumn. /e have grown seed for three or four years with fairly good results, obtaining ten ushels per acre.

Q.: Mr. Tweddle says it is necessary to have some crop to hold the vetch up, if you are to get good results in the way of seed.

Mr. Zavitz We have found the same thing. Where the vetch is grown with a few oats, it will give a better quality of seed. Mr. Tweedle has used it as a cover crop in his orchard and is very much pleased with it.

Mr. A. E. Sherrington: I have not used it, but it has given good satisfaction in the Walkerton neighborhood.

Prof. W. J. Spillman . Has any one sown it with rye? We find rye the best crop to sow with the vetch. They ripen together, and the rye allows the vetch to develop well. We sow about three pecks of rye to three or four pecks of the Hairy Vetch.

Prof. J. W. Gilmore : In New York State we prefer rye to oats, because it is stronger, and also has the advantage of being thinner on the ground.

Q.: Is that for seed production ?

Prof. Gilmore : Yes; for fodder we prefer oats.

Mr. J. E. Brethour : We have found the vetch very successful as a pasture for hogs.

Mr. Mason : I think three pecks of rye would be too thick in this locality, as the rye stools out so.

Mr. Fraser : Is there no danger of its becoming a weed?

Mr. Zavitz : I do not think there is any more danger of the Hairy Vetch becoming a weed than the Common Vetch, which is extensively grown in the Old Country for green fodder purposes. With regard to Mr. Brethour's statement, I may say that there is no other crop which we sow in the spring that gives as much pasture as the Hairy Vetch.

Prof. Spillman : In the eastern part of Washington Territory the Hairy Vetch is an extremely bad weed, but it has not become a weed in any other part of the United States

Mr. Mason : Mr. Orr objects to it as a cover crop in the orchard, for the reason that it makes such a complete mat as to provide a perfect shelter for mice in the winter time, and he has discarded it on that account.

Q.: What about Pencilaria ?

Mr. Zavitz : It was advertised extensively a few years ago, and we obtained some of the seed. We found it exactly the same as Pearl Millet, which we have grown for several years, and which we have found to require a much longer season for growth than we possess in Ontario.

Mr. J. W. Clark : We grew two acres of Emmer last year, yielding 58 bushels to the acre. We did not sow till May 24th. The weather was very dry, and it did not come up till the early part of June, but then it stooled out rapidly. The grain was very plump, and the straw of excellent feeding quality.

Mr. Zavitz : This year we sowed Emmer on six or eight different dates, and found there was not much difference between the crops from seed sown on different dates during the spring.

Q.: Why is it classed among the spring wheats?

Mr. Zavitz: It is one of the seven classes of wheat.

Q.: Could it be used for making flour?

Mr. Zavitz : Yes; it is grown in the southern part of Germany and in northern Italy, and they have special machinery for separating the hull from the grain, and then the grain can be made into flour.

Prof. Spillman : There are also winter varieties grown in Europe.

Mr. Zavitz : We tested one winter variety, but it did not give very good results.

Q.: What is the percentage of hull?

Mr. Zavitz : There is from twenty-three to twenty-five per cent. of hull on the Emmer. It has a very thin hull. The average hull of oats is thirty per cent.

Mr. Glendinning : If you deduct the hull, 23 per cent., from the yield given on your table, the yield would be about the same as that of Hulless barley.

Q.: Is there any particular value in the hull?

Mr. Zavitz : The principal part of the hull consists of woody fibre, but at the same time, when it is ground with the grain, it makes a lighter and a more satisfactory food to use.

Q.: Would there be any difference in the feeding value of the hull of Emmer and that of the oat ?

Mr. Zavitz: I suppose there would be some difference, but I have not seen an analysis showing the composition of the hulls of the Emmer.

Q.: How would it do to mix Emmer with oats and barley in the seeding, instead of using wheat for the mixing?

Mr. Zavitz: We tried it in each of the past two years, but it did not give as good results when sown with other grain as when sown alone. It does not seem to stand crowding.

Mr. T. H. Mason : The late Mr. Tillson grew great quantities of Soy beans and put them in the silo, mixed with corn silage, and was well satisfied with the result.

Q.: It was difficult to get them dry enough to keep well last year, was it not?

Mr. Zavitz : It was an exceptional year. We matured the crop here, however, and we find by taking the average of eight years' experiments, that the Early Yellow variety usually ripens well.

Q.: Are all the varieties of winter wheat here mentioned of good milling quality?

Mr. Zavitz : They are all good milling wheats.

Q.: How far north can you grow these varieties of corn and obtain the results here indicated?

Mr. Zavitz : All three varieties can usually be ripened in nearly all parts of Old Ontario. Yields equal to those represented in these results should be obtained a considerable distance north of Guelph. The King Phillip proved to be slightly the earliest and the North Star Yellow Dent slightly the latest in the cooperative experiments in 1903.

Q.: Do you not find that you get potatoes sunburned with flat cultivation ?

Mr. Zavitz : Not if you plant them deeply enough. If planted at a depth of four inches, we have found that not more than one or two per cent. were sunburned. We have obtained a better yield per acre from level than from hilled cultivation.

Mr. W. J. Brown : Have you any idea as to the amount of available fertility there is in cow manure?

Mr. Zavitz : We decided in every case to use good average cow manure for the sake of uniformity.

Q.: Is not 40,000 pounds a heavy application?

Mr. Zavitz : That is twenty tons, or about twelve good-sized loads, per acre.

Q.: Do fertilizers have any effect on the length of time a crop takes to ripen ?

Mr. Zavitz : Some of them exert some influence in the time in which a crop will ripen. If you use nitrate of soda, it is apt to cause a vigorous growth and to prolong the ripening of the crop; I think it would retard it even more in a wet than in a dry season.

Prof. Harcourt : It is always supposed that phosphates hasten maturity and nitrates retard it, potash being practically without any effect in either direction.

Q.: Which fertilizer would give the best results the year following?

Mr. Zavitz.: You would undoubtedly obtain the greatest influence in the second year from farmyard manure. The commercial fertilizers which were used are all readily available, and the fertility would likely be nearly all used by the crop in the first year.

Prof. Harcourt : Muriate of potash and superphosphate would not leach away, and any of the plant food not used the first year would remain for future crops.

Q · Do you think it would be wise to adopt the use of commercial fertilizers on grain crops?

Mr. Zavitz: The results of the co-operative experiments strongly indicate that it would be unwise to use these fertilizers extensively with grain crops. In the case of turnips, however, where we increase our crop at a cost of 1.7 cents per bushel, it shows a profit.

Mr. J. W. Clark : I conducted an experiment last year with some samples of fertilizers sent me from Germany. I took three plots of one-third of an acre each, and planted them with barley. One plot was fertilized with pure phosphoric acid, one plot with nitrates and phosphoric mixed, and one plot was not fertilized at all. The yield from the plot fertilized with phosphoric acid was 80 bushels to the acre; with mixed fertilizer it was 60 bushels, and on the unfertilized plot it was only 30 bushels per acre. The plots fertilized were perhaps a week or ten days earlier in ripening, and their green appearance made them noticeable at a great distance.

Mr. Zavitz : That shows the value of individual experiments. What might apply on Mr. Clark's farm might not apply on some other man's farm. In our experiments the results of which I have submitted, we have taken an average of the different tests made all over the Province. In the Eastern States I have seen fertilizers used with exceedingly marked results, but when used here they did not give anything like the same results. I think the reason is that we still have a good deal of the natural fertility in the soil, and as we are raising stock extensively, the soil is about holding its own in fertility on many farms.

Prof. Harcourt : The following table indicates how much fertilizing material was shipped out of the country in 1902, in the form of wood ashes, bones and tankage:

Material.	Tons.	Value per ton.	Total value.
		$	$
From Dominion :			
Bones	2,457	12	29,484
Tankage	3,536	20	70,720
From Ontario :	bushels.		
Wood ashes	1,073,840	5c. per bus.	53,692

These figures represent fairly well the amount of the various materials exported annually, but we cannot estimate the tons of bones and ashes which are allowed to go to waste throughout the country. We can get nitrogen in abundance by caring for the farmyard manure and by plowing down certain crops which gather nitrogen from the atmosphere ; but potash and phosphoric acid are being continually taken away from the farm in grain, beef, and milk, and the bones, tankage, and ashes are our natural substances for replenishing these losses.

In the case of ordinary fertilizers, it is impossible for a man to use these economically without having an intelligent knowledge of the food requirements of the different crops, and how these requirements are likely to be met by the soil upon which they are to be grown. This knowledge can soon be gathered by a system of experimenting.

Wood ashes sell at 10, 15 and 17 cents per bushel on the other side of the line. I think we ought to be ashamed to see American papers constantly advertising Canada ashes for sale. Much of our own land needs potash, and over a million bushels of ashes go out of the country every year. We have no record of the number of tons of bones continually wasted around the farm, or in regard to the millions of bushels of wood ashes that are practically wasted about the farm. These are the amounts sold, and if a man values wood ashes only at the price of a little piece of soap per bushel, he is not likely to take much care of those ashes, so that these figures represent only a small amount of the total actual loss to the farmer.

In the case of ordinary fertilizers, it is utterly useless for one man to depend on the records of another man; each man must study the results obtained on his own soil; it all depends on the condition of the ground. Some crops need potash, others phosphates, and others nitrates, but it depends largely on the condition of the soil; so I would advise no man to buy artificial fertilizers without first testing his soil.

Mr. Clark: My soil was clay.

Prof. Harcourt: Many of our clay soils need phosphoric acid.

Mr. W. A. McKinnon, Chief of Fruit Division, Ottawa: Prof. Harcourt's conclusions are borne out by the conclusions we arrived at on our own farm at Grimsby.

COOPERATIVE EXPERIMENTS WITH SMALL FRUITS.

By Prof. H. L. Hutt, Ontario Agricultural College, Guelph.

This is our tenth annual report upon the cooperative testing of fruits in connection with the Experimental Union. It may be well for us, therefore, to take a brief retrospect and note what progress the work has made.

Past Progress and Present Extent of the Work.

The co-operative testing of small fruits was begun ten years ago, with 60 experimenters. Every year since then the number has been steadily increasing, until we have now on our books the names of 1,297 experimenters who are or have been engaged in this work. Naturally, quite a number drop out from year to year, but each year a large number of new members engage in the work, and we drop from our lists as soon as possible those who neglect to send in reports as required. Over 600 reports have been received so far this year, and many more will no doubt come in yet.

At first these experiments were confined to about half a dozen counties, but now they have found their way into every county and district in the Province, and in this connection it is interesting to note that the greatest number of applications for plants comes from those sections where more attention to the cultivation of fruits is most needed.

Plant Distribution.

The following circular, which was sent out early in the spring, gives the list of lants offered for testing this year:

Dear Sir,—Through the agency of the Experimental Union, arrangements have again e made for furnishing plants for a number of co-operative experiments with small ruits.

The varieties for the several experiments offered this year are as follows:
I. Strawberries—Clyde, Tennessee Prolific, Irene and Van Deman—12 plants of each.
II. Raspberries—Cuthbert, Golden Queen. Marlboro', and Columbian—6 plants each.
III. Black Raspberries—Gregg, Kansas, Palmer, and Souhegan—6 plants each.
IV. Blackberries—Agawam, Gainor, Kittatinny, and Snyder—6 plants each.
V. Currants—Fay, Raby Castle, Victoria, and White Grape—2 plants each.
VI. Black Currants—Champion, Lees, Naples, and Black Victoria—2 plants each.
VII. Gooseberries—Downing, Pearl, Red Jacket, and Whitesmith—2 plants each.

Each person wishing to join in the work, may do so by choosing one of the experiments and signing the agreement contained in the accompanying form of application. The experiment selected may be indicated by number. It is well for each applicant to make a second choice, in case he may be too late for the first. The supply being limited, plants will be furnished in the order in which the applications are received; those who apply promptly will be most likely to receive what is asked for.

Instructions for conducting the test will be sent to each experimenter before the plants are mailed, and blank forms will be furnished from year to year, upon which to report the results. All will be furnished free of charge, and the plants and produce become the property of the experimenter. In return, we expect that each experimenter will follow the instructions given, and will report each year, as requested upon the growth and yield of each variety under test

These plants are purchased from nurserymen at considerable expense, and, as the funds at our disposal for this purpose are limited, we can seldom furnish plants to more than half of those applying for them. We would like, therefore, that they go to those only who will make an honest effort to make the experiment a success, and we trust no one will apply for plants unless he is prepared to make such an effort, and will report the results as requested.

Trusting that your interest in the work may lead you to become a successful experimenter.

The experiments offered were much the same as last year, except that a new experiment was added with black currants. This makes the list complete, so that it now contains all of the bush or small fruits which should be grown in a farmer's garden. The varieties selected are those which have been found by repeated tests at the College and at our Ontario Fruit Experiment Stations to be among the best to cover the season from early to late.

The number of plants sent out of each variety is just enough to afford a comparison of the varieties and to give the experimenter a start if he wishes to increase his stock and grow more for himself.

The number of plants for each experiment may seem small, but when we take into account the number sent out of each kind for each year, it is surprising how fast these figures count up.

During the past ten years we have distributed 344 black currant bushes, 3,066 red and white currant bushes, 3,908 gooseberry bushes, 5,396 blackberry bushes, 6,648 red and white raspberry bushes, 6,744 black raspberry bushes, 37,584 strawberry plants, making a total of 63,690 plants.

APPLICATION FOR PLANTS.

The following form of application, which is sent with the circular offering plants for testing, states the terms upon which the plants are furnished, and is in reality an agreement to follow our directions and to report the results:

Dear Sir.—Kindly forward to me the plants for the experiment which I have selected as indicated below. If my application is received in time to entitle me to them, I agree

1. To conduct the experiment according to directions furnished.
2. To look after the plants and exercise care and accuracy in reporting the results.
3. To report upon the growth and yield of each variety at the end of each season, as requested.

Name...
Post Office..
County...
Experiment chosen 1st choice..
(Indicate by number) 2nd choice...
Address all communications, etc.

GENERAL DIRECTIONS TO EXPERIMENTERS.

As soon as our list of new experimenters for the year is made up, the following circular is sent, informing them that they may expect to receive the plants, and giving general directions for conducting the experiment:

Dear Sir,—I am pleased to inform you that your application for plants for co-operative testing was duly received, and that the plants will be forwarded to you as soon as the weather is suitable for planting. If they cannot be planted as soon as they are received, they should be unpacked, so that the roots may be spread out, and buried in moist earth; but the sooner they can be permanently planted, the better.

The soil upon which they are to be planted should be as uniform as possible, so that all varieties may have an equal chance.

As soon as planted, each variety should be carefully labelled. Stout wooden stakes, painted white, written on plainly with a lead pencil, and driven firmly into the ground answer the purpose well. It is advisable, also, to make a record of the planting in a note book, in case a label should at any time be lost.

I trust you will follow the directions carefully, and that you will not allow poultry or trespassers to interfere with the fruit. The weight of the entire crop from each variety is one of the most important items desired in your annual report; and, in order that this may be given accurately, it will be necessary for you to carefully weigh and record each picking, so that the total yield of each variety may be reported at the end of each season. Blank forms will be mailed to you in due time each season, upon which to make such report.

The value of this experiment depends largely upon the attention given to it. I trust you will find it both interesting and profitable. From this small collection of plants you may, in time, by good management, propagate for yourself all the plants you wish, without interfering with the value of the experiment in the least.

Should you require any further information regarding the work, kindly let me know, and I shall be glad to give all the assistance possible.

Accompanying these general directions, special cultural directions are also sent for each particular kind of fruit under test. These cultural directions are here given in connection with each experiment:

THE STRAWBERRY EXPERIMENT.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of barnyard manure.
2. Set the plants in rows, at least 4 ft. apart and about 18 inches apart in the row. If two or more varieties are planted in the same row, leave a space of at least 3 ft. between them to avoid mixing of the runners.
3. The best method of planting is to use a spade, thrusting it deeply into the ground, then pressing it backwards and forwards. In to the opening thus made, spread out the roots fan-shaped, and pack the soil firmly about them with the foot.
4. Give clean, thorough cultivation throughout the season, and never allow the soil to become crusted.
5. Pinch off all blossoms the first season, that the plants may make vigorous growth and not waste their energies trying to produce fruit.
6. Confine the runners of each variety to its own row, allowing them to form matted rows about a foot and a half wide. If any of the plants should die, place the runners of the adjoining plants so that they will fill up the spaces.
7. As soon as the ground is frozen in the fall, cover the whole plantation with an inch or two of strawy stable manure. When danger of frost is over in the spring, rake the coarsest of this covering off the plants and tread it down between the rows for a mulch. If it is not thick enough to keep down weeds and retain moisture, more may be added, at any time in the spring.
8. To continue the experiment from year to year, a similar plantation should be set out each spring, taking a dozen new plants of each variety from the plots set out the year before. The old plots may be plowed up after the second crop is off.
9. Carefully weigh and record the weight of each picking from each variety, and report as soon as possible after the fruiting season.

The varieties of strawberries distributed last spring, were Clyde, Tennessee Prolific, Irene and Van Deman, the Irene being substituted for the Saunders, which was sent out the year before. Plants were sent to 119 experimenters, 83 of whom have reported upon the condition of the plants this fall. A few report all plants living and doing well, and quite a number report all plants dead. On the whole, the planting was not nearly so successful this year as last. It was an extremely hard season on the plants. To begin with, the plants were very slow in starting growth in the spring, and the severe drouth for over a month after planting taxed their vitality to the utmost.

In our plots at the College, particularly among the new varieties brought in from a distance, there were more failures than we have had during the past ten years, and it is to be hoped we will not have another spring like it in the next ten years.

Seventy experimenters report upon the plants set out the year before. Clyde easily heads the list for productiveness, but a number remark upon its light color. Tennessee Prolific stands second for productiveness, and seemed to be a favorite with many experimenters. Van Deman is reported by many of the experimenters to be the weakest grower of the lot, but it is valuable because of its earliness, and the berry is of a beautiful dark, rich color, and handsome appearance. Saunders did not do so well as the others, although it is on the whole a good standard late berry. This year the Irene was substituted for it.

Twenty five reports were received on those plants sent out two years ago all of which go to prove very conclusively that it does not, as a rule, pay to leave a strawberry plantation to fruit the second year. Our practice here, and that of most growers, is to take but one crop, and have a new plantation coming on every year.

In order to bring before the experimenters the advisability of continuing the experiment with plants of their own growing, the following circular was sent out early in the spring to all experimenters who had received strawberry plants the year before :

> Dear Sir,—As you are one of our co-operative experimenters who received strawberry plants last spring, I take this opportunity of requesting that, if possible, you will continue the experiment by setting out a new plantation this spring, taking a dozen young plants of each variety from the plots set out last year.
>
> I make this request because our experience has shown that good home-grown plants are always more satisfactory than those obtained from a distance. If, then, you can set out a new plantation with plants of your own growing, you may reasonably look for much better results than from the plants obtained from us.
>
> If any of the varieties have not lived, or have failed to make enough plants, you will, of course, be unable to conduct the experiment in full. Nevertheless, you will find it to your advantage to set out new plots of the varieties you have.
>
> In making a new plantation, the same general directions as given last year should be followed.
>
> Should you require any further information regarding the work, kindly let me know, and I shall be pleased to give all the assistance possible.

THE RASPBERRY EXPERIMENT

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of manure.
2. Plant in rows 5 or 6 feet apart, with plants 5 feet apart in the row.
3. Give clean, thorough cultivation until about the beginning of August, and never allow the soil to become crusted.
4. Pinch off any blossoms which may form the first year, that the plants may not waste their energies trying to produce fruit.
5. Do not allow the varieties to become mixed by letting the suckers grow between the bushes.
6. In the fall, or early in the spring, cut out all old canes that have fruited, and leave about six of the strongest new canes to each bush. Shorten the ends of these to a uniform height, making the bushes uniform and symmetrical.
7. In northern localities, where winter protection is needed, bend down the canes late in the fall, and cover the tops with earth to keep them under the snow.
8. Should any spaces have to be filled, or should the experimenter wish to increase his stock of any of the varieties, it may readily be done by taking up the young suckers which spring up about the bushes. Columbian is propagated by bending down and covering the tips of the new canes in August. They will make good plants by the next spring.
9. Carefully weigh and record the weight of each picking from each variety, and report as soon as possible after the fruiting season.

The varieties for this experiment were the same as those sent out last year, viz. Cuthbert, Golden Queen, Marlboro', and Columbian.

Forty-four lots of plants were sent out and thirty-two of those receiving them reported this fall upon the success of their planting. Some few had lost all their plants, but on the whole the results were very satisfactory, considering the dry time after planting.

Twenty-six experimenters report upon the fruiting of those plants sent out the year before. With nearly every one of them Columbian had given the heaviest yield, and Marlboro' the next heaviest. This was a little surprising, as Cuthbert is usually conceded to be a better yielder as well as a better berry. Golden Queen is the best of the yellow raspberries, but has proved far less productive than the other varieties.

Twenty-seven reports were received upon the plants sent out previous to 1902, an average of which shows that Cuthbert holds first place. Shaffer was then on the list instead of the Columbian, as at present, an a number of experimenters report that that variety suffered badly with anthracnose, a fungous disease on the canes, which has also been our experience with it here.

THE BLACK RASPBERRY EXPERIMENT.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of manure.
2. Plant in rows 5 or 6 feet apart, with plants 5 feet apart in the row.
3. Give clean, thorough cultivation until about the beginning of August, and never allow the soil to become crusted.
4. Pinch off any blossoms which may form the first year, that the plants may not waste their energies trying to produce fruit.
5. To make the bushes stout and stocky, pinch off the ends of the new canes during the early summer, when they are two or three feet high.
(In northern localities, where winter protection is needed, this should not be done, as the canes should grow long and slender, that they may be more easily laid down.)
6. In the fall, or early in the spring, cut out all old canes that have fruited, and leave about six of the strongest new canes o each bush. Shorten the ends of these to a uniform height, making the bushes uniform and symmetrical.
7. In northern localities, where winter protection is needed, bend down the canes late in the fall, and cover the tops with earth o keep them under the snow.
8. Should any spaces have to be filled, or should the experimenter wish to increase his stock of any of the varieties, it may readily be done by propagating new plants from the tips of the new canes, which should be bent down and covered with earth in August. They will make good plants by the next spring.
9. Carefully weigh and record the weight of each picking from each variety, and report as soon as possible after the fruiting season.

For this experiment the varieties were Gregg, Kansas, Palmer, and Souhegan. Forty-four lots were sent out and thirty-three reported this fall upon the growth of the plants. In this experiment there are usually more failures in transplanting than with any of the other fruits, and this year was no exception to the rule. This is because these plants have soft, tender roots, which are more liable to be injured in transmission in the mails. They are easily propagated, however, and if the grower gets one or two of each variety to live he can soon propagate as many more as he wants. One experimenter who received plants five years ago reports having increased the Hilborn, the variety which did best with him, till he had a two-acre plantation of it.

Thirty-four experimenters report upon he fruiting of plants sent out previous to last year. The reports are far from satisfactory on account of the poor stand of plants, but on the whole the Palmer has given the best results. Two of the favorite varieties in our experiments at the College have been the Older and Smith's Giant, but I have not yet been able to get these in sufficient quantity for distribution to the experimenters.

THE BLACKBERRY EXPERIMENT.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of manure.
2. Plant in rows 5 or 6 feet apart, with plants 5 feet apart in the row.

3. Give clean, thorough cultivation until about the beginning of August, and never allow the soil to become crusted.

4. Pinch off any blossoms which may form the first year, that the plants may not waste their energies trying to produce fruit.

5. To make the bushes stout and stocky, pinch off the ends of the new canes during the early summer, when they are two or three feet high.

(In northern localities, where winter protection is needed, this should not be done, as the canes should grow long and slender, that they may be more easily laid down.)

6. In the fall, or early in the spring, cut out all the old canes that have fruited, and leave about six of the strongest new canes to each bush. Shorten the ends of these to a uniform height, making the bushes uniform and symmetrical.

7. In northern localities, where winter protection is needed, bend down the canes late in the fall, and cover the tops with earth to keep them under the snow.

8. Should any spaces have to be filled, or should the experimenter wish to increase his stock of any of the varieties, it may readily be done by taking up the young suckers which spring up about the bushes.

9. Carefully weigh and record the weight of each picking from each variety, and report as soon as possible after the fruiting season.

The varieties for this experiment were Agawam, Gainor, Kittatinny, and Snyder. Forty-seven lots were sent out, and thirty-eight of the experimenters report excellent results in transplanting. The majority have a full stand of plants.

Thirty-six experimenters report upon the plants sent out in 1901 and 1902. Little or no fruit was borne on the 1902 bushes, as it usually takes these bushes two years to begin fruiting. Of those sent out in 1901, Agawam is reported as being the hardiest and most productive.

THE CURRANT EXPERIMENT.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of manure.

2. Set the plants five feet apart each way, in one or more rows, as convenient.

3. Give clean, thorough cultivation until about the first of August, and never allow the soil to become crusted.

4. Look out for currant worms on the lower parts of the bushes soon after the leaves are fully grown. They may be destroyed by spraying with Hellebore (1 oz. to 3 gallons of water), or Paris green (1 oz. to 10 gallons of water).

5. Prune early every spring. A good method of pruning is to leave six branches to form the bush, then keep up a renewal of new wood by cutting out, every year, two of the oldest branches, and allowing two strong new ones to take their place. Cut out all other new canes, and shorten back the new wood left, nearly one-half.

6. Carefully weigh and record the weight of the crop from each variety, and report as soon as possible after the fruiting season.

The varieties sent out for this experiment were: Fay, Raby Castle, Victoria, and White Grape.

Twenty-nine experimenters received plants this spring, all but three of whom reported this fall on the growth of the plants. Nearly all report all plants living and doing well. The currant stands shipment and transplanting better than most any other fruit, and for this reason experimenters are nearly always successful with the plants sent. Fifty-one reports have been received, upon he bushes sent out previous to last year. Victoria has given the heaviest yield, and Raby Castle comes next, but Fay is a favorite because of its extra large, fine berries. The White Grape is one of the best of the white currants, and although it does not begin bearing quite as soon as the other kinds, it is generally reported as one of the most productive after the bushes get well established.

A BLACK CURRANT EXPERIMENT.

A black currant experiment was added to the list this year for the first time. The cultural directions for which are practically the same as those for the red and white varieties.

Forty-three experimenters took this experiment this year, thirty-five of whom reported this fall upon the growth of the plants. Twenty of these report all plants living and doing well, while very few of the other report more than one plant failed. This promises well for future reports. The varieties sent out were: Champion, Lee's, Naples, and Black Victoria. No fruiting could, of course, be expected from these this year.

THE GOOSEBERRY EXPERIMENT.

1. Prepare the land deeply and thoroughly, working in, if necessary, a liberal application of manure.
2. Set plants five feet apart each way, in one or more rows, as convenient.
3. Give clean, thorough cultivation until about the first of August, and never allow the soil to become crusted.
4. Look out for currant worms on the lower parts of the bushes soon after the leaves are fully grown. They may be destroyed by spraying with Hellebore (1 oz. to 3 gallons of water), or Paris green (1 oz. to 10 gallons of water).
5. Whitesmith is subject to mildew. This may to a great extent be prevented by spraying with potassium sulphide (1 oz. in 2 or 3 gallons of water.) It should be applied early in the season, just as the buds are swelling, and five or six times afterwards, at intervals of ten days or two weeks.
6. Prune early every spring. A good method of pruning is to leave six branches to form the bush, then keep up a renewal of new wood by cutting out, every year, two of the oldest branches, and allowing two strong new ones to take their place. Cut out all other new canes, and shorten back the new wood left nearly one-half.
7. Carefully weigh and record the weight of the crop from each variety, and report as soon as possible after the fruiting season.

For the gooseberry experiment the varieties sent out were: Downing, Pearl, Red Jacket, and Whitesmith. Of the thirty-nine experimenters who received plants last spring, twenty-six have reported this fall. On the whole, the planting of these has been very successful, the chief failures being among the plants of the Whitsmith. This is one of the English varieties, which is naturally less vigorous than the other varieties.

Sixty-two reports were received on the bushes sent out previous to this year. The varieties vary more or less in different sections, but on the whole Pearl is the favorite variety, because of its good size and great productiveness. Downing comes next, and is much like Pearl. Red Jacket and Whitesmith rank next, in the order named. Both of these produce much larger berries than the other two, but are not so productive, and in some places the Whitesmith is reported to have been badly mildewed. This disease very seldom attacks the other varieties.

VALUABLE FEATURES OF THIS CO-OPERATIVE WORK.

In conclusion, we may add that the greatest value of this co-operating testing is not seen in the brief summary presented at this annual meeting, but it naturally accrues to the men who carry on the work on their own farms. The following might be mentioned as a few of the ways in which this work is doing good:

1. Through our distribution many are getting a start in the growing of small fruits, who would probably never have made a start had the plants not been given them.

2. The cultural directions furnished afford a means of College extension work, which is enabling growers to begin right.

3. The varieties sent out are those which have been found by repeated tests at the College and our Fruit Experiment Stations to be the most likely to prove satisfactory.

4. From the plants furnished, the experimenter may, if he wishes, soon propagate enough to set out a good-sized plantation.

5. The experience and information gained in properly conducting one of these tests is an education well worth the effort required.

W. A. McKinnon, Ottawa: I should like to call the attention of the Union to what was the key-note of the Fruit Growers' Association meeting at Leamington. It was co-operation for the advancement of the well-being of the fruit industry of Ontario. There is no more fitting place to urge the claims of co-operative work than before this

Union. I should like to say in what respects the fruit growers may co-operate, and in what respects the farmers who are fruit growers may improve their returns. First, they may co-operate in the purchase of trees in order to secure the best varieties for their respective sections; second, in the methods of cultivation, pruning and spraying; and, third, in the purchase of power outfits, by which, it is safe to say, the returns from an apple orchard alone would be increased fifty per cent. annually. Co-operation will secure a uniform product as regards quality. Then by the adoption of the central packing-house idea, the fruit can be graded and packed alike, and assorted in large shipments. Much better return would then be secured on the British market, for the reason that buyers could obtain as many barrels as they wanted of the varieties they desired.

CO-OPERATIVE EXPERIMENTS IN FORESTRY.

By Roland D. Craig, B.S.A., F.E., Director of Cooperative Experiments in Forestry, Pasadena, Cal.

Resolution: The following resolution was moved by Mr. Nelson Monteith, ex-M.P.P., Stratford, Ontario, and seconded by Mr. Ernest C. Drury, Crown Hill, Ontario, and carried, at the Annual Meeting of the Experimental Union, held in December, 1902:

"The Experimental Union, recognizing the urgent necessity for action in the re-foresting of the waste lands throughout Old Ontario, would recommend that the Department of Crown Lands be requested to provide material sufficient to re-forest areas sufficiently large to provide forest conditions in typical situations throughout Ontario, the Union undertaking to supervise the distribution."

Report on Resolution: After the last annual meeting of the Experimental Union, the resolution passed at the meeting was forwarded to the Hon. E. J. Davis, Minister of Crown Lands for Ontario. Soon afterwards the Secretary of the Union received a private letter from the Crown Lands Department, stating that the resolution would receive their best consideration. Nothing has been heard in reference to the matter since receiving the letter here referred to.

It is with much regret that I find it impossible to attend the annual meeting of the Experimental Union, and I trust that it may be as profitable and enjoyable this year as those of former years which I have been permitted to attend.

It is to be regretted that, owing to the lack of encouragement given to the Committee on Forestry, it has been unable to carry on the work outlined in the last report, and the Committee has to make another appeal to the Experimental Union and to the Government for aid.

Last year the Committee asked for means to supply farmers with working plans for their woodlots, and to establish a nursery to supply plant material where planting was advisable. The Minister of Agriculture gave but slight encouragement for the establishment of a nursery on the Ontario Agricultural College property, and it was suggested that the Department of Crown Lands be asked to supply a site in the woods of Northern Ontario. Mr. Southworth was very willing to do so, but he could find no one experienced in nursery practice to manage a nursery if established. Those who suggested putting the nursery in the backwoods evidently mistook the policy of the Experimental Union, and expected it to undertake the reforestation of the lumber districts of Ontario, rather than the encouraging of woodlots on the farms. To repeat the suggestion of last year,—the Experimental Union will find enough to do in its own sphere without attempting to reforest the Crown Lands. The Union is an agricultural organization, and its efforts should be for the farmers before the lumbermen.

Our object should be to improve and increase the forested area in our agricultural districts, in order, first, to supply fuel, posts, and other forms of wood useful on the farm; second, for the conservation of water; third, for protection from wind, lightning, etc.

Most people recognize the value of forests, but not of forestry; they see the evil effects of denudation, but have never considered the possibility or advisability of restoring former conditions by artificial means. It remains with us to show them that such a thing is, first, advisable, and then that it is possible. Forestry has been one of the subjects discussed at the Farmers' Institutes for some years, and should be made a still more prominent feature in the meetings in order that the advisability of cultivating forests may be demonstrated. But what the Experimental Union should do is to prove by actual experiment that practical forestry is possible on an Ontario farm.

In the United States any farmer, upon making application to the Bureau of Forestry, can have his woodlot examined and a working plan made for it. At very little expense, a member of this committee could visit woodlots throughout the Province, and advise the owners as to the management.

In many cases, natural reproduction is not sufficient, nor of the proper kind, and planting will have to be resorted to. At present, it is almost impossible to procure plant material for forest planting, because many nurserymen rear seedlings only for ornamental purposes, and expect fancy prices. It is, therefore, almost necessary that a nursery be established, from which to supply farmers with plant material free, or at a nominal price. Thee requisites for such a nursery are :

1. Suitable soil and climate.
2. Skilled management.
3. Facilities for shipping easily and quickly to all parts of the Province.
4. That it be located so that it may be used for instruction and demonstration to the farmers of Ontario.

Northern Ontario could undoubtedly furnish suitable soil and climate, but it is doubtful if the timber-jacks would be capable of taking care of a nursery, or if shipping facilities would be as good as in a more central place, and certainly the last very important feature would be entirely lost.

Guelph is particularly well suited for such a nursery, and surely two or three acres might be spared from the 550 acres belonging to the College.

The use of "pulled" seedlings from the woods was suggested at the last annual meeting, but experience has shown that this practice is a failure, for several reasons, viz.:

1. Seedlings grown in the shady and sheltered woods have their organs for transpiration, assimilation, etc., developed for that condition, and when brought out to a light, exposed place, are unable to cope with the new conditions, and die.

2. Their root system grows long and spreading, so it is almost impossible to pull them without greatly injuring the roots.

3. It is so difficult to pull them, and they grow so scattered in the woods that, in the end, it is cheaper to grow them from seed in a nursery.

Canada is certainly very slow in realizing the importance of forestry, as one sees when comparing the forestry departments of Germany and the United States. The Bureau of Forestry alone spends $375,000 annually, besides the many thousands spent by the individual States in the protection and investigation of the forests. The State of California has voted $15,000 for two years' investigations, the Bureau of Forestry duplicating this amount. I merely mention this to show that it would not be unreasonable to expect the Ontario Government to grant $500 for the protection and improvement of the farmers' woodlots.

In conclusion, let me ask every member of the Union to cooperate with the Committee on Forestry by voting for a resolution asking the Government to establish a forest nursery at the Ontario Agricultural College, and a grant of $500 for its maintenance and for inspection of woodlots.

Mr. E. C. Drury: I think that our motion of last year has been somewhat misunderstood. That motion did not contemplate the reforesting of Crown Lands to the north. The intention was this: There are acres and acres of waste land scattered among the farming land in some parts of Simcoe County, and in other counties. It is not of much value agriculturally, but it was once covered with a good crop of small pine. This land was cut over carelessly and burned, the means of reforestation were destroyed, and much of it is now entirely waste. These areas could be reforested with great advantage, and our motion was that the Government should allow us to experiment with one such area, in the hope of inducing the municipalities to take hold of the matter. I still think that this is a matter that is worth attention. In one other matter, I think the Union could do something, and that is in regard to the taxation of woodlots. I believe that in some municipalities a reduction of taxes is made on woodlots, but in many of the townships in the district where I live the woodlots are assessed for their value as land, plus the value of the timber, which is certainly a heavy burden on the man who leaves a woodlot, and the Union might well draw attention to the folly of such a system.

Mr. C. A. Zavitz: It will be difficult to carry out a project of this kind until we have a better home for forestry in Ontario. The committee itself is composed of men who are located in different parts of the continent. If we could locate a home of forestry at some definite point, with a permanent director and a committee to assist him, it seems to me that there would be an opportunity for some splendid work. I think that the move to establish a School of Forestry is in the right direction, and I move that a committee be appointed to make a recommendation on the subject for the meeting to take action upon.

After this resolution was seconded, a discussion took place as follows:

Mr. T. H. Mason: I think that the work of our forestry section should take two distinct lines. First, efforts should be made to induce the Provincial Department of Crown Lands to withdraw altogether from settlement those sections of the north country that are unsuited to agriculture, making such sections into forest reserves. By that means the errors of the past may be avoided in future. If the Government had done that in the back part of Addington, Hastings, and some other counties, it would have been far more profitable. We should also urge the desirability of reforesting sections in Old Ontario where the natural power of reforestation has been destroyed.

The second aim should be to arouse the farmers as to the desirability of properly preserving their woodlots.

Dr. W. H. Muldrew: I have taken a live interest in the subject in a practical way for some years. I should like to refer to the cost of providing seedling trees for farmers. Last year in the State of New York a large number of pine seedlings were grown and planted out. They cost the purchaser at the State nurseries half a cent each. I obtained a box of these seedlings from Prof. Gifford, and we planted them in the school grounds at Gravenhurst. If any of the members of the Union should visit that town, I hope they will go to the High School, and look up the small plot containing the two hundred pine trees which my pupils set out. So far, the results have been very gratifying. The little trees took root and grew rapidly, for it is well known that the pine will grow much more rapidly under cultivation than in the woods.

As to the regrowth of the pine, I have direct knowledge of a farm in Simcoe County where the second-growth pine sold from a portion of a fifty-acre farm netted $2,000. I suppose there are in Simcoe, and in every other county, hundreds of farms having considerable sandy land which is now going to waste, but which if planted with pine could be made to yield very profitable returns. I am very much in sympathy with what has been said as to the necessity for some centre for the forestry work.

Mr. Mason: I had a ten-acre lot covered with second-growth pine, chestnut and cherry, which I sold last year at $200 an acre. It was eighty years old.

Prof. J. W. Gilmore, Cornell University: In New York State, we are making an effort to beautify the school grounds, and are interesting the scholars in the work. The children take a great interest in the work of planting trees and flowers and watching them grow. These things have an important bearing on the development of rural life, and in keeping the children interested therein. When once they have learned to appreciate these things at school, they will introduce them in the garden at home and into the farm life, and efforts will be made to beautify the farm home and improve its surroundings. If the committee having this matter in charge could get the work started in the schools and get the children interested in it, it would be a great feature.

R. R. Elliott, Owen Sound: The forestry question is a very important one, and in the interest of the country, it is time that something was done. The Union can help to do it by talking it up among the farmers, writing it up in the press, and getting people interested. Then something will be done.

Mr. J. H. Faul, University of Toronto: It was not until 1898 that the Forestry Act was passed by the Provincial Legislature, and the Government has not yet taken any steps towards preserving the forest lands in Ontario. However, Hon. Mr. Davis, Commissioner of Crown Lands, stated in an interview recently that the policy of the future was that mature timber only should be removed, and that an attempt should be made towards reforesting. If the large area to the north of us, which is to conserve our water and timber supply, is to be properly cared for, it must be in the hands of foresters who have had careful, scientific training, and if the announcement of Mr. Davis meant anything, it meant the establishment of a School of Forestry, where competent men could be trained to deal with these questions. It is important also to give instruction and advice to the farmer in the conservation of his woodlot, and instruction to students of institutions such as this, so that they may deal intelligently with the matter on their own farms.

The resolution was carried by vote of the members.

The President then appointed Dr. W. H. Muldrew, N. M. Ross, and E. C. Drury a committee to consider the matter and report.

The committee presented the following resolution, which was adopted on the motion of Mr. Drury, seconded by Mr. T. G. Raynor :

"Whereas, in many sections of settled Ontario, the process of deforestation has been carried on far beyond the proportion between woodland and cleared land, shown by the experience of other countries to be necessary to the best maintenance of agricultural conditions, of climate and water supply ;

"And, whereas, a very considerable proportion of lands thus deforested are totally unfit for agriculture, and, in consequence, are at present unproductive :

"And whereas, the feasibility of profitably maintaining such area of forest lands has been demonstrated in this Province ;

"And whereas, the present method of taxing farm woodlands discourages their preservation ;

"And whereas, the supply of wood products necessary for the general interests of the Province is rapidly diminishing;

"Therefore, the Ontario Agricultural and Experimental Union would strongly urge upon the Government the necessity,

"(1) For establishing at the earliest possible date a School of Forestry, where instruction will be given in practical methods of dealing with forestry problems;

"(2) For collecting accurate information from the municipal authorities as to the amount of lands unfit for agriculture in the settled townships of Ontario;

"(3) For undertaking the practical re-forestation of areas sufficiently large to afford forest conditions, as a demonstration of the utility of the work on these lands, which, from their surroundings, enjoy practical immunity from fire;

"(4) For considering some means of adjusting taxation so as to encourage rather than to discourage the preservation of farmers' woodlots."

Hon. John Dryden, Minister of Agriculture: I have been very much interested in the discussion on the forestry question, and while I can agree with everything that has been said, I am not prepared to say, as I have no doubt you would like me to do, what can be done with regard to creating a centre for forestry operations. A great many men in public life are moved this way or that by the politics in it, so that you have to keep up the agitation, and if you young men who are just coming into usefulness in this country will keep stirring up this question, you will probably get what you are working for.

I cannot sit down without saying, as I have often said before, that this organization of young farmers and older farmers is one of the most important agricultural organizations we have in this country. You who are carrying on these experiments do not know perhaps how much value there is in your work, and you will not know for years to come. It is a work that requires a great deal of thought, and there are yet many things for you to take up which will be of increasing usefulness as the years go by.

I have just returned from the International Exhibition at Chicago, the largest of its kind in the world. I saw great things there, for it is a country of great wealth and great resources, and everything is on a very extensive scale. But when I come back here and visit the Union and the Winter Fair, and listen to the reports and discussions, I see the working machinery running, as it were. It is doing wonders for us, and I feel proud of my country, for I feel when I see this machinery in operation that, although they on the other side of the line have many things that are far superior to ours, yet we shall be able to hold our own with them, and to send our products wherever theirs will go; and it is because of the educational work that is being done by this Union and other similar institutions in this Province. I wish you every success. Anything I can do shall be done, but the best way that a Government, or a Minister of Agriculture, or a President of a college can help you is to try to find out some way whereby you can help yourselves. I do not believe in spoon-feeding the people. If I could only inspire our young men with the thought that they can help themselves by co-operation in their work, I should be doing far more than by shovelling out money for them to spend. Work along those lines, and you are assured of great success.

COOPERATIVE EXPERIMENTS IN POULTRY RAISING.

By W. R. Graham, B.S.A., Guelph.

This year we had six successful incubator experiments. This work requires a great deal of detailed information, and we find difficulty in getting experimenters to fill out the charts properly. We find that, while the charts that were used are good as far as they go, they do not go far enough, and that we should have a great deal more information. They should indicate, for example, how many chickens are alive on the tenth day. Those who have operated incubators will understand that it is a comparatively easy matter to hatch a large percentage of chickens, but it is a very different matter to hatch a large number that are sure to live. The difficulty we have is that the chickens take diarrhoea at about the age of ten days. This is a form of indigestion, and is largely due to imperfect incubation. The temperature is too high, or the humidity is too high, or it is not high enough. We want a chart that will show this. To give the desired information properly, some knowledge of embryology will be necessary on the part of the experimenters. We therefore wish to get about a dozen men who are willing to devote any amount of time to this work, and examine the eggs every day, and in that way we may be able to come to some conclusion.

We have had a larger number of chickens from our incubator experiments this year than last. Six experimenters hatched 7,057 chickens, the incubators holding 197 eggs on an average. There was an average of 135 good germs in each machine, or 68.7 per cent. of the eggs set. The machines made an average hatch of 58 per cent. of the eggs set. The greatest trouble in connection with artificial incubation is the handling of the incubator during the first ten days. If you run the machine at 105 degrees, and at the same time leave the ventilators wide open you will find that the greater number of the chickens hatched will have bowel trouble. The way we found this out was by the introduction of pure oxygen gas. We found that, while this may be of some value towards the end of the hatch, at the beginning it was a bad thing. It seemed to stimulate the heart action, and the chickens grew too fast, and on examination the eggs showed a blood ring following around the embryo. When you see that indication at the eighth day, you may at once come to the conclusion that you have run the incubator at too high a temperature or have given too much air, probably both, and you may be sure that you will have trouble with those chickens after they hatch.

In our experiments this year we found that while an experimenter would succeed in hatching from 80 to 90 per cent. of the living germs, and that the chickens seemed to do well for five days, at the end of that time in many cases a lot of them died. In the next batch, perhaps all would live. The reason for this is the point upon which we want to get more detailed information.

Q.: Would there be any ill-effects from running the machine at a little lower temperature at the beginning?

A.: If you hold the machine at 101 or 102 degrees, not higher, and keep the ventilators shut, you will get good results. After the twelfth day you may open the ventilators a very little, and also air the eggs. During the first eight days I would put the eggs back into the machine as quickly as possible.

Q.: In early spring hatches, which month is the best ?

Mr. Graham: We find it practically useless to hatch February eggs. If you have mild weather towards the end of January, and can get the hens out to exercise, and give them plenty of clover hay and meat food, not mashed food, you will get eggs that will give good chickens. Our experiments show that it takes three December eggs, four January eggs, and from five to six February eggs to produce on an average a good marketable chicken.

Q.: What is the cause of chickens failing to break through the shell? I notice that sometimes they succeed in getting the beak through and then die.

Mr. Graham: It may be due to weakness in the breeding stock. Another cause for this is lack of moisture in the machine towards the finish of the hatch.

Q.: The incubator had plenty of moisture.

Mr. Graham: At what season was it?

A.: A February hatch.

Mr. Graham: Then it was probably due to defective stock.

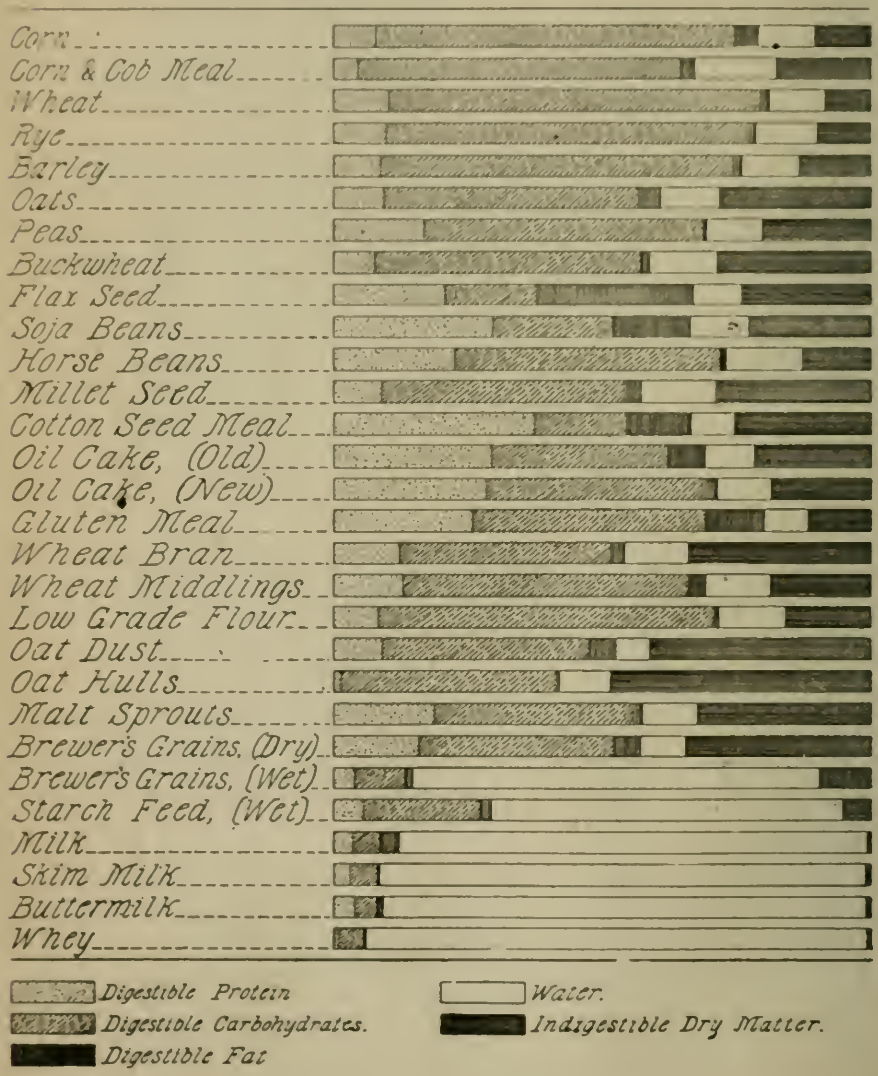
Mr. R. Thomson, St. Catharines: I had the same difficulty with March and May hatches, and my hens were allowed out.

Mr. Graham: It is not always an easy matter to explain these things.

Q: What is the proper time to close the ventilator for good?

Mr. Graham: From the night of the eighteenth day. I do not think you can air the eggs too much during the last week. If the outside temperature was 60 degrees, I would not be afraid to let the eggs air for half an hour, but I would not do it at the start.

Table Showing Digestible Constituents
Also Total Indigestible Matter and Water
in 100 lbs.



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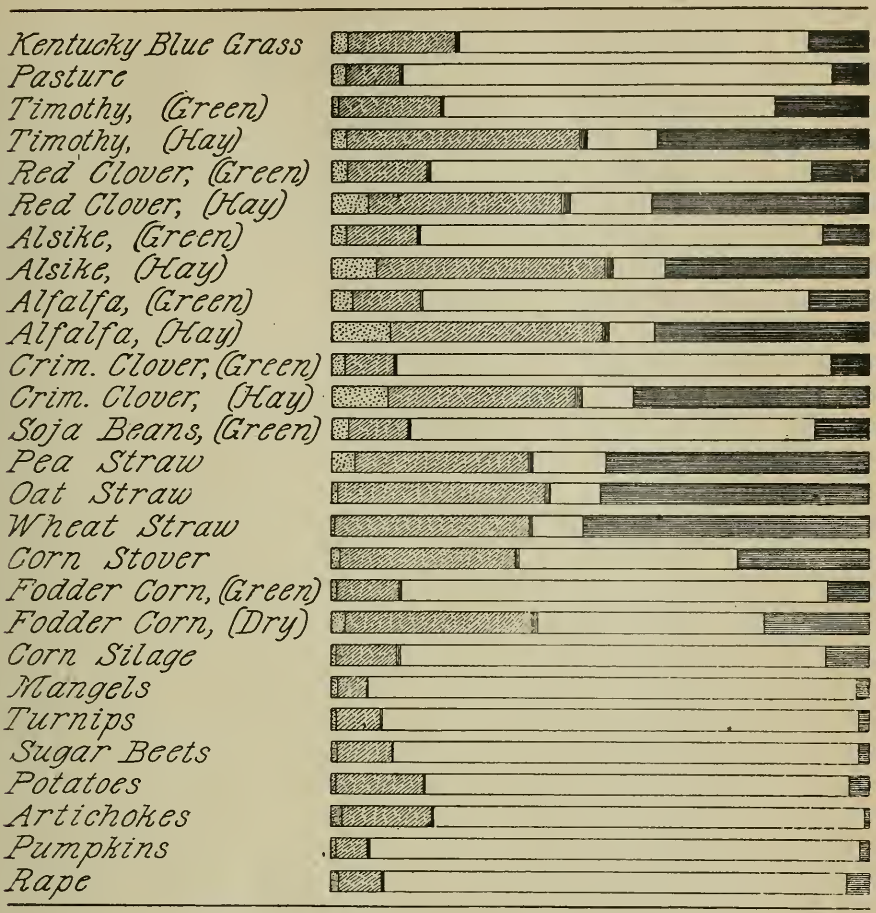

THE PRINCIPAL FEEDS AND FODDERS AVAILABLE TO ONTARIO FARMERS.

By Prof. G. E. Day, Agricultural College, Guelph.

Everybody knows that the different parts of an animal must be built up from what enters the animal's stomach, and that in the animal's body we have different classes of materials, for instance, first, the bony skeleton; second, the muscles and the tendons, and a great many other products somewhat similar in composition, which all contain the element, nitrogen; and, third, the fats of the animal body, which contain no nitrogen.

Only a part of the food the animal consumes can be utilized. A certain portion is digested and assimilated by the animal, and the remainder thrown off, and it is only that part which the animal digests and assimilates that can be of use to it, and therefore we shall deal simply with the digestible constituents of the food.

These constituents may be divided into three, or, I might say, four, main classes; first, those which go to build up the muscle, a portion of the blood, a portion of the milk, part of the hair, horn, hoofs, etc. There are a large number of these compounds, differing more or less in composition, but similar in their effects on the animal's body, and they are all grouped under the general term, protein.

Then we have another group of substances which are concerned in building up the fatty portions of the animal, and also in keeping up the heat of the body, or the energy of the animal. To this group belong such substances as starch and sugar, and many other substances somewhat similar in composition, and they are all grouped under the general term, carbo-hydrates.

In all foods we also have substances similar in composition to fat; flax-seed, for instance, has a high percentage. In an analysis of a food, the substances that come under this head include other substances that are not true fats. Consequently the chemist usually employs another term for these. He calls them ether extracts—but we shall simply refer to them as fat.

Then, we have another class of substances which comprise what is called "ash." These go to form bone.

In the accompanying chart, an attempt has been made to represent the amount of digestible protein, carbo-hydrates, and fat in a number of our leading food stuffs, and of these I have endeavored to make a fairly representative selection. I have been unable to represent the amount of ash contained in these foods on a chart of this kind, because it exists in such small quantities. We have also included the water content.

An animal requires all these constituents in order to thrive properly. Of course, it is possible to maintain some animals for a considerable time on a ration that is free from certain of these constituents, but if you took an animal and fed it on pure protein, you would soon sicken it; and the same is true of the other constituents. To do its best, an animal requires a certain amount of each. When we have a ration containing all these constituents in the most suitable proportion for a given purpose, we have what is called a "balanced ration." A great deal of time and labor has been spent in investigating what constitutes a balanced ration for different classes of animals. We have as a result certain feeding standards put forth. Thus, the dairy cow requires per day, per thousand pounds live weight, so much protein, so much carbo-hydrates, and so much fat.

I should like to point out just here what seems to be rather an inconsistency, or a divergence of our practical experience from some of these feeding standards. The peculiarity about the dairy cow is that if you feed her a ration that is poor in protein, which is used in building up the casein in the milk, she will not give you milk that is poor in casein. She will give you milk of the same quality, or practically so, as you got from a ration rich in protein, but she will give you less milk. So that if you cut down the amount of protein in a cow's ration, if she is going to give you milk of the same quality, she must necessarily give you less of it. In the case of a dairy cow, the standard works out fairly well, but in the case of a fattening animal, there seems to be some divergence.

In certain standards the amount of protein for a fattening animal is usually stated to be about equal to what is required for a cow, but we have found in our work that a steer which is fed a comparatively small amount of protein in proportion to carbo-hydrates, has given the most economical gain.

Prof. Henry, in his book on "Feeds and Feeding," gives as an average amount of grain required for 100 lbs. of gain in the case of a fattening steer, to be 1,000 lbs. He makes this estimate from the results of experiments at experiment stations, and from the experience of practical feeders. But if you study the methods followed generally in the United States in feeding steers, you will find that they feed exceedingly heavy meal rations. In our results we have had experiments with light and heavy rations, and when feeding what we call a heavy meal ration, we find that it requires about 565 pounds of grain for 100 pounds of gain, in addition to the bulky fodder. In our light ration experiments we obtained just about as large gains (in some cases quite as large), and it required only 310 pounds of grain for 100 lbs. of gain, which is less than a third of the amount given as the average amount in the United States. The experience of nearly all our Canadian feeders at the present time, when the difference between the buying and selling price is so small, is, that they must feed a light grain ration, or one comparatively low in protein and rich in carbo-hydrates, in order to make ends meet; and our best feeders here and elsewhere are feeding a light grain ration. I simply throw this out as a suggestion, and the matter is one which will bear further investigation. I know that the most expensive feeding we have ever had about this place was done by men who followed some of the old ideas, and dealt out the grain with a liberal hand. They all got gains in weight, and pretty large gains too, but when you came to reckon it out, you found that the animal had apparently not assimilated all its food, and that the gain in weight was expensive. So I say that, taking practical results and comparing them with the standards laid down, we are led to the conclusion that there must be something wrong. It seems to me that the case of the fattening steer is different from that of the dairy cow. In the former, the main thing we want is fat. We buy a steer that is pretty well grown, and practically all he requires is to have some fat put upon him, and, in producing fat, it stands to reason that a ration rich in carbo-hydrates should produce cheaper gains than one rich in protein, because the protein of the food is much more expensive to buy than the carbo-hydrates. I am fully convinced from practical results that there is something wrong about the standard laid down for fattening steers.

Among the concentrated foods given on the chart, corn is at the head of the list of grains as a fat former, because I believe that as a single food there is no grain that equals corn as a fat producer. In an experiment last winter where we fed blood meal with corn, we got no result from feeding blood meal. Corn is rather low in protein as compared with barley, rye, and wheat, but it is rich in carbo-hydrates. It is rather poor in ash or bone-forming material, and is therefore not a satisfactory ration to feed largely to growing animals. Something else is required to supply the muscle and bone forming materials.

Corn and cob meal is naturally a little lower in digestible matter, but the ground cob mixed with the corn has given satisfactory results in feeding. In many experiments it has given as good results as the pure corn meal. The explanation is this : the pure meal is of a heavy, close nature, and is a little more difficult to digest than when it is mixed with the more bulky material of the ground cob. In any case, I think a food like corn should be lightened up with something such as oats or bran, to overcome that objectionable feature.

In all cereal grains there is a similarity of composition. Oats are rather low in carbo-hydrates, due to the fact that the hull contains much woody fibre. The amount of fat is comparatively high, higher than in wheat, rye, or barley. Rye comes between wheat and barely in feeding value ; it is a little lower in carbo-hydrates, protein and fat than wheat, but a little higher in these constituents than barley.

Peas are rich in protein and also fairly rich in carbo-hydrates. A good many are surprised at the small amount of fat in peas, and think there must be something wrong in the analysis. You can easily see the reason for it: it is not the fat alone that is concerned in fat production, but the carbo-hydrates also produce fats, and so does protein.

Pasture grass is very nearly a balanced ration for a dairy cow.

Flax seed is a food that is badly out of balance. If you compare it with cotton seed meal and oil cake, you will see that in all of them there is too much protein and fat, and too little carbo-hydrates. Consequently we have here suitable foods to mix with foods poor in protein. That is the reason why cotton seed meal is so valued by dairymen—because it brings up the protein content when mixed with ensilage, etc. It is a good food to combine with one that is poor in protein.

Gluten meal is also rich in protein and fat. The term gluten meal is rather loosely employed. Gluten meal is a by-product from starch factories, but we have a by-product from those factories which is not true gluten meal. The true meal has all the bran of the corn removed, but the gluten meal from some of our factories contains the whole of the by-product from the corn, and should preferably be called gluten feed. It is a valuable food, but not so valuable as gluten meal.

As a food to balance the ration of a dairy cow and increase the protein, bran is better than middlings, but for pigs, middlings forms a much more valuable food.

Oat hulls are rather poor in digestible matter, but oat dust compares favorably with bran in this respect. The trouble with these products is to determine what they really contain. Take oat dust ; you never know how many hulls you are getting mixed with it; it will vary so much with different mills.

Q.: Is oat dust ordinarily known as black dust?

Prof. Day: Yes; I believe so.

Q.: We have on the market a white dust and a black dust ; the white seems to be a meal.

Prof. Day: I have been unable to find any table giving digestible constituents of white oat dust.

Q.: There is a difference in the market price, the black dust being $10 per ton, while the white is often over $20.

Mr. Graham: We use white dust in the poultry department, costing about $1.30 per hundred.

Prof. Day: As regards malt sprouts, the complaint is that it is not a very palatable food, and only a small amount can be used, otherwise it is a valuable food in balancing a ration.

Brewers' grains, dry, are also rich in digestible matter. The wet grains have a large proportion of protein to carbo-hydrates, but also a large amount of water, and I assume that the reason they have given such good results in milk production is due to the fact that, where fed in considerable quantities, they help to balance the ration, as they contain so much protein in proportion to carbo-hydrates. One difficulty with them is that they tend to ferment in the mangers, and therefore cause an unsanitary condition in the stable.

The Soy bean is exceedingly rich in protein, about the same as oil cake, and richer in fat than oil cake. It is a very concentrated, rich food, and where it can be grown advantageously, would be a most valuable food in balancing a ration.

As regards the bulky foods, you will observe that fodder corn dried in the field is very similar in protein content to timothy hay, and is somewhat similar in general composition.

Oat straw has a considerably higher feeding value than wheat straw. Barley straw comes between the two. Pea straw of good quality is rich in protein, and contains more digestible matter than oat straw.

Mangels, turnips and sugar beets are practically the same in protein content. In feeding dairy cows, in two experiments here, we got just as good results from mangels as from sugar beets, but for fattening purposes we should expect better results from sugar beets, as they contain more carbo-hydrates. While the chart shows turnips to contain more dry matter than mangels, I may say that this is very variable, depending very much on the season.

Artichokes are higher in feeding value than potatoes, and Mr. Brethour, whom I see is present, has had excellent results from them as a food for hogs. Pumpkins have about the same protein content as turnips and mangels, and are of somewhat similar feeding value.

Rape, compared with green clover and blue grass, contains more water. The total amount of food it produces per acre is very considerable.

If you compare Kentucky blue grass with the ordinary mixed grasses, you will see why it is so highly esteemed for fattening cattle where cattle are fattened on pastures —because it contains a higher percentage of digestible matter for a green food.

Last year in our experiments we used tankage and blood meal. Our Canadian houses sell these products as fertilizers, but they are not prepared for feeding purposes. That which we obtained from Swift & Co., of Chicago, had been put through a special process to purify it, and hogs are very fond of it. As you will see, it has a very high food value, and I think it is a pity that our packers sell this material for fertilizing purposes.

We conducted several experiments with blood meal and tankage in feeding hogs. One lot of hogs fed on blood meal, barley, and middlings, the blood meal being valued at $45 per ton, and the grain at $20, made gains at a cost of $4.16 per hundred pounds. Another lot was fed tankage (valued at $30 per ton), with grain, and made 100 pounds of gain, at a cost of $4.24. A second lot fed the same ration made gains in weight at a cost of $4.05 per hundredweight. In comparison with this, we fed two lots of hogs grain and skim milk, the latter being valued at 10 cents per hundredweight. These lots cost $5.40 and $4.78 respectively for one hundred pounds of gain.

I think these are most valuable foods for young pigs, especially where skim milk is not available, and we intend to conduct further experiments in this direction.

Q.: Have you not placed a low value on skim milk?

Prof. Day: Yes, I wanted to give it a low valuation, but even when valuing it at only ten cents per cwt., the cost of gain ran a good deal higher than in the other groups.

Q.: Was it a summer experiment?

Prof. Day: Yes; and the packer's report stated that all the pigs were first class as regards firmness. They had been fed a little green food, grass, etc., every day, by way of variety, but not enough to count in the results.

J. H. Grisdale, B.S.A., Central Experimental Farm, Ottawa: Alfalfa is a crop that is being neglected somewhat in this country. It may be grown almost anywhere in Ontario, and in many parts of the other Provinces. We have grown it successfully at Ottawa, and it has given excellent results as a food for cattle, sheep, and swine. The trouble in the past has been to get a good catch. That may be overcome by careful seeding and preparation of the land beforehand. One must not think that because it is one of the clovers, it may be grown in any kind of a field without proper preparation. On the contrary, it requires very careful preparation. Once it has been made to catch, it will stand for some time, and leave the soil in much better condition.

Prof. Day did not refer to the value of sugar beets in feeding hogs. They are of great value for that purpose. They must be fed judiciously, however, or they may cause soft bacon. In our experiments we have had exceptionally good results with them.

No food we have used for hogs has given such good results as rape. I think it should be fed more extensively, and fed to different classes of cattle than at present. For beef production, or for young cattle, it cannot be surpassed, especially in the fall, when it may be grown to great advantage, as it may be sown upon stubble after the grain is harvested, and will yield a good crop under fair climatic conditions, furnishing pasture in the latter part of September and all through October and November. There is no food that will pay better for the money and the trouble it takes to cultivate it, than rape. For milk production the same thing applies. I do not want to recommend it too strongly for use with dairy cows, but a few farmers in our district have been using it for that purpose, and declare that they have never fed any forage plant that could compare with it as an economical milk producer. I have found that turnips have given better results in milk production than mangels, but there is a danger of their giving an objectionable flavor to the milk.

Prof. W. J. Spillman: Any of the ordinary crops which affect milk may be fed with impunity if they are fed to the cow immediately after you get through milking; but you must not feed them within eight hours previous to milking. If turnips are fed within a few hours of milking, they will flavor the milk, but you can feed all the turnips you want to if you feed immediately after milking.

Mr. Grisdale; Dried sugar beet pulp is a product which is now being placed upon the market in this country, and demands attention. It contains a high per cent. of dry matter, and to it is added about forty per cent of dry molasses. It makes a very palatable food, and seems to agree with the cattle and has a good effect on their appetites and digestive organs. We have been able to feed eight pounds per day without any injurious effects. It costs $10 to $12 per ton. Molasses is also fed in liquid form, but one has to be careful not to feed too much.

In the concentrated foods, Prof. Day mentioned gluten meal and gluten feed, and pointed out how much these foods varied in their constituents. In Eastern Canada we have the real gluten meal. The average gluten food from Ontario tests only 34 to 36 per cent. protein, and contains the hulls, or the bran, and the sweepings. We have fed gluten meal very extensively, and I may say that I think it should be used more extensively, only I am afraid that if so used the price would likely be raised. A few years ago it could be purchased at $10 per ton—to-day it is $25.

This raises a point that is worth discussion, and that is the importance of knowing exactly the contents of these by-products, such as gluten meal, oat dust, oat hulls, etc. Each manufacturer of these by-products should be required by the Government to place upon the sacks containing the foods, an analysis of the contents, just as is required in the case of plant foods, which we never think of buying without knowing what they contain. It would cost a little, but the cost would be as nothing in comparison with the good that would result from being able to select that food which is most easily digested and is the richest in the elements of animal food.

Q.: How does corn bran compare with wheat bran?

Mr. Grisdale: It is not nearly so rich in protein or in carbo-hydrates.

Prof. Day: In the case of the blood meal and tankage, I forgot to mention that it is guaranteed to contain 60 per cent. protein for tankage and 87 per cent. protein for blood meal, so that the purchaser knows exactly what it contains.

Prof. W. J. Spillman: I wish to emphasize one point the last speaker made, and that is as to the importance of alfalfa. It is a new crop in this section and in the Eastern States, but it has always been the leading hay crop in the Western States. There was 2,000,000 acres of alfalfa grown in 1899. Since then the area has been much increased, and in the Eastern States we have begun to think that it is the most important hay crop we can grow. I am not surprised to learn that you can grow it here, because it grows readily in Michigan and Wisconsin, which are farther north. In Onondaga County, N.Y., alfalfa has been the standard hay crop for fifty years.

As to the best ways of utilizing that crop, I may say that it is essentially a hay crop. It will give three crops a year, and when once well established on land fairly free from weed seed, it is good for a long time, unless you should happen to have a very unusual winter to kill it out. There is a field in Onondaga which is said to have been sown 42 years ago, and still has a pretty fair stand of alfalfa. In no way will it yield a larger return than as a pasture for hogs. A great many of the farmers in our country are doing this, and are making very large returns. I know one who kept ten head of hogs to the acre of alfalfa, and they were not able to keep it down, and he cut it for hay once, and got a ton to the acre. It is possible to grow good large hogs on alfalfa without any other food, but the best results have been obtained from feeding a small amount of some other food along with it, such as corn. I would feed about two ears per day to hogs pastured on alfalfa. In our country we can produce hogs at less than three cents live weight on alfalfa and corn.

I want to urge the importance of another point suggested, and that is of having some way of knowing the composition of these meal products. Every year they become more and more important as feeding stuffs, for the reason that manufacture is on the increase, and these by-products are becoming more plentiful and more numerous in variety. Almost every year sees a new kind put upon the market. They vary a great deal. Some millers in our country, and I assume it is the same here, add the bran and the dust from the floor sweepings, saying that dust is one of the by-products. A number of our State Governments require that these products be guaranteed; that is, there must be placed on every package a tag showing the composition, which they guarantee. It is an excellent law, and might well, I think, be adopted here.

Mr. W. P. Gamble, B.S.A.: In analyzing these by-products, we have found that they vary very widely in composition. We obtained a sample of oat dust from a mill, and found it contained 8.12 per cent. protein and .37 per cent. fat. A year later we took a second sample from the same mill, and found it contained 12 per cent. protein and 2.99 per cent. fat. The same variation occurs in the case of oat hulls, gluten meal, and other products of a similar nature.

Many stock foods contain high percentages of ash, which is largely the potassium salts, which are not valuable constituents and are hard on the excretory organs, and it is therefore not desirable to feed such foods to any great extent.

Mr. de Coriolis: Reference has been made to sugar beet pulp. This pulp used to go out from the factory containing 90 per cent water, and with such a large amount of water, the cost of transportation was too high in proportion to the value of the feed. This year, however, one factory has installed a drying plant, which has reduced the moisture to three per cent. The composition of the pulp is then as follows:

Water	3.17	per cent.	Protein	7.68	per cent.
Fat	.72	" "	Ash	6.03	" "
Fiber	20.67	" "	Carbohydrates	61.73	" "

It is rather high in fibre and low in ether extract, and the manufacturers thought of improving it by having the pulp absorb crude molasses. It then has the following composition:

Water	2.70	per cent.	Protein	8.81	per cent.
Fat	1.46	" "	Ash	6.34	" "
Fiber	14.11	" "	Carbohydrates	66.58	" "

This is a great improvement. The reason I bring this to the attention of the meeting is that there is a large amount of this pulp being produced. There are four sugar factories working in Ontario, which, combined, will use 100,000 tons of beets each season, and half of that amount will go out as pulp with ninety per cent. of moisture. If all this pulp were dried, the output would still be very large, and would have to find a market, and it is important to know its composition and its value as a cattle food.

We have not made any experiments as yet as to the digestibility of this food, and it will be necessary for us to do so before we can make any definite statement as to its value

Prof. W J Spillman I am very greatly interested in what I have learned about pulp. It has been fed extensively in our country, and with great satisfaction Unfortunately, our factory men have refused to put in drying plants, with one exception in Michigan, and most of the feeding has been done with wet pulp. I hope all your factories will put in driers. There will be no difficulty in disposing of the pulp if it is dried and molasses added to it, provided it is advertised

Mr. J. E. Brethour : In reference to artichokes as pig food, I have given this matter some attention, and am pleased to say that this root forms a very desirable vegetable food for hogs. It is a richer food than the potato, and gives better results. One great advantage with this crop is that it may be planted at a leisure season in the fall It will then come up early in the spring, and can be fed the following fall. What roots are left in the fall will not spoil, but may be fed in the spring. There is therefore no trouble with storage, which entails a great deal of work. They are also valuable in keeping animals healthy, as they get exercise in searching for the roots. Some grain food should be fed in conjunction with them. The system of growing is similar to growing potatoes. They are planted in drills fourteen to eighteen inches apart, and cultivated on the flat. If they are not fed too closely, it is not necessary to plant a second time. The second season we plow the ground and work it on top, then leave it till the roots sprout, and as soon as we can see them in the field, we cultivate them out in rows. It is an economical way of furnishing a bulky food. I am informed by people who have tested them that they will yield from one thousand to twelve hundred bushels per acre, and, if that is the case, I am sure there is no more valuable food.

Q.: What sort do you use?

Mr. Brethour : The white artichoke.

Q.: What time in the fall do you plant?

Mr. Brethour : Any time after October, so as to remove any danger of sprouting, and cultivate the first thing in the spring.

Q.: How much seed to the acre?

Mr. Brethour: About 25 bushels.

Q.: Do you cut them?

Mr. Brethour: No; we have never gone to that trouble.

Q.: Where can you secure the seed?

Mr. Brethour: I secured mine from a man who was growing them near me.

Prof. Spillman: With reference to alfalfa, it is very dangerous to pasture cattle or sheep upon alfalfa alone, as they are subject to bloat. Sometimes cattle will refuse to eat it at first, but they soon get used to it.

Prof. Zavitz: I have known of two or three instances in Ontario where cattle died from pasturing on alfalfa alone, but where it was sown with a mixture of grasses I have not known of such cases.

Prof. Spillman: Some farmers in Ohio sow it with brome grass and clover. It is an excellent mixture, and with it the danger of bloating is extremely small. If wheat straw stacks are available, the danger is reduced to nothing, as the cattle will eat the alfalfa for two or three hours and then eat the straw.

Prof. Grisdale: We are growing it pure and mixed, and I think it is quite possible to grow it profitably in a rotation where there is only two years in hay. The crop is very much greater than we could get from the common red clover, so much so that it more than pays for extra cost of seed.

ANALYSES OF BY-PRODUCTS.

Mr. Henry Glendinning, Manilla, opened a discussion on the analysis of by-products: I think the time has come when the Union should memorialize the Government at Ottawa to pass a law compelling the manufacturers of by-products, such as gluten meal, and other feeding stuffs, to place upon each package a certificate of the chemical contents. I would, therefore, move the following resolution: "That this Experimental Union memorialize the Dominion Government to enact a law that the manufacturers of all by-products used as feeding stuffs for live stock, such as bran, oil cake, gluten meal, etc., be compelled to place upon the package the analysis of the same, showing the protein, carbohydrates, and ether extract the food contains, and that the same be guaranteed."

The resolution was seconded by Mr. T. G. Raynor.

A Member: In Wisconsin the State sends out men to take samples of these products, which are analyzed, and a bulletin published giving information as to what they contain, so that the farmer knows just how the State analyses compare with the guarantee given by the manufacturer. Would it not be wise to adopt some such provision here?

Mr. Glendinning: I hardly think it would be necessary, providing we had a law requiring the contents to be given. Samples could then be taken from the packages and sent to Ottawa, where they could be analysed to see if they came up to the standard.

Mr. Robt. Thompson : I think that bran should be left out of the resolution, as there would then be more hope of having it put into effect.

Prof. W. J. Spillman, Washington, D. C.: In our country the farmers need a law in reference to bran as much as they do anything, because it is very grossly and frequently adulterated. In our country such laws apply to bran, and protect the farmers greatly.

Mr. Glendinning: It is hard to tell what a great deal of the bran you buy consists of. It appears to contain a great deal of dirt and foreign material, such as the sweepings of the mill.

The resolution on being voted upon was carried.

GRASSES AND CLOVERS FOR HAY AND FOR PASTURE.

By Prof. W. J. Spillman, Agrostologist, Department of Agriculture, Washington, D.C.

What I shall have to say will be confined largely to the grasses of the United States, because I am not familiar with the conditions in Ontario, except what I infer from the conditions in the States similarly situated across the line. I know what must be the conditions here from what the conditions are in Wisconsin. That State, perhaps, comes more nearly duplicating the conditions here than does any other State in the Union.

In the United States we have 414,000,000 acres of improved land, and of that, 125,000,000 acres is devoted to permanent pasture ; that is to say, it is not plowed land. We have 219,000,000 acres of plowed land, from which crops are actually harvested. That gives you some idea of the relative importance of permanent pasture and plowed land. Of the plowed land, 61,000,000 acres is devoted to hay crops. More than three-quarters of the grass land, principally the hay land, is in those States which are contiguous to the Province of Ontario, at least to Canada—north of the Ohio River and east of Nebraska and the Dakotas, so that nearly all the grass is grown in a corner of our country touching on this part of Canada. I infer from that that the proportion of land devoted to grass in Ontario is larger than in the United States, taken as a whole.

A few words regarding the varieties that constitute the 61,000,000 acres. I may say that in the United States we have over 15,000,000 acres of wild grasses, which are of use for hay. They are included in the acreage given. That leaves 46,000,000 acres of tame hay, which includes 4,000,000 acres of fodder crops. There are 31,000,000 acres of timothy out of the 46,000,000 acres, or mixtures in which timothy is the leading constituent. Next to timothy comes red clover, with 4,000,000 acres. The 31,000,000 acres includes all mixtures in which timothy is found, and most of the clover is sown with timothy, but there are 1,000,000 acres of clover sown without any admixture all sown north of the Ohio River and east of Nebraska.

In addition to the clovers, we have four million acres of crops that our census takers designate as fodder crops, including sorghum cut for feed, Kaffir corn cut for fodder and maize when cut for silage or soiling purposes. On the Pacific coast a lot of wheat when found to be mixed with wild oats is cut for hay, and in every State of the Union more or less of the oat crop is cut for the same purpose. All told, about 3,000,000 acres of grain are cut annually for hay. There were 2,404,000 tons of alfalfa hay cut in 1899; I imagine the area is double that now, as there has been an enormous increase. In Dallas, Texas, from which town most of the alfalfa seed sown in Northern Texas is supplied, no less than 500,000 lbs. of alfalfa seed were sold last year, which is considerably more than is generally sold for like areas, but it is only an indication of what has been taking place over the eastern half of the United States. The farmers are just as much interested in alfalfa there as they are in California.

Alfalfa is a plant to which I have given more attention during the past year than to all the other hay crops put together. It is not a pasture plant; it does not stand pasturing very well, and is easily killed off by pasturing. It is a very dangerous thing to pasture cattle and sheep upon it in most regions. In the irrigated region of the west, it is almost the only hay crop, and I know of at least one farm that yields eight and a half tons per acre.

Q.: How many cuttings?

Prof. Spillman: From three to four a year. In southern California they get from six to nine crops, according to the amount of water they have. It is not a pasture plant, except for hogs, and it is the best hog pasture I know of. Col. R. E. Smith of Texas, who grew 800 acres of alfalfa last year, is pasturing hogs on it, and getting results that I will not tell you about, because I have already told you too many improbable stories.

As to the soil on which it will grow: It will not grow on heavy clay land, unless it is in very dry seasons; it will drown out. It will not grow where its feet are kept wet.

A Member: There is a section of Ontario, namely, in Brant and Haldimand, where alfalfa is most successfully grown, and yet the soil is an extremely heavy clay; but it is a dry subsoil.

Prof. Spillman: Perhaps you and I would differ about what a heavy clay soil is. If it thrives well on that soil, I am certain that it is not, strictly speaking, a heavy clay soil. It will grow on any soil that has an open, porous subsoil, free from standing water at all times of the year.

Q.: Is it true that a certain bacteria has to be introduced in order to get the best results?

Prof. Spillman: Yes; it is a leguminous plant; it produces its seed in a two-valve pod like a pea pod, which is a characteristic of all these plants, including beans, peas, clovers, and Soy beans. All these have certain parasitic bacilli on their roots, which give rise to the formation of warts on the roots. You will find the roots of the ordinary garden pea covered with these. On red clover they are twice as large as an ordinary pinhead; so they are on alfalfa, but they are long and white in color. They are caused by the presence of bacteria. If the soil does not have in it the kind of bacillus required by alfalfa, then it is probable that alfalfa will not thrive on that soil until that bacillus has been introduced there. We have tested that thoroughly in Washington. We have sent out thousands of specimens of seed of all the legumes, inoculating half the seed with bacilli, and in all cases magnificent crops were obtained from the inoculated seed, while the other half was a total failure. We have done that so many thousand times that we are ready to say positively that unless these bacilli are present it will pay to add them to the soil. In some districts they are already present.

Q.: Will the same bacteria inoculate red clover and alfalfa?

Prof. Spillman: No, there is a different one for each kind of legume; but the kind which flourishes on red clover will thrive on alsike, and vice versa, and the kind that grows on sweet clover thrives on alfalfa; but as a rule, if you take the bacteria of one of the kinds and put it on another, the plant will not thrive as well as if you take its own kind.

Q.: Where can we get that bacteria?

Prof. Spillman: Our department in Washington furnishes it free to our farmers, I do not know whether they would send it here, but if you will annex us we will do it. (Laughter.)

Q.: How is it sent out?

Prof. Spillman: In the form of powder. The farmer puts this in a bucket of water, in which the bacteria will grow. He sprinkles the water over the seed, lets it dry, and sows it. Or if you know that a certain soil is inoculated all right, get a sack full of dirt from that field and scatter it over the new field.

Q.: Would you recommend the Government here to supply it to the farmers?

Prof. Spillman: Yes; alfalfa does not thrive readily without it. It would not cost a great deal for the Government to do it, as the methods have been thoroughly worked out. We will send your Government all the bacteria it needs to start with, and all that will be necessary will be for some man to attend to it. It will not cost more than $1,500 a year to grow all that could be utilized in Canada.

Mr. W. S. Fraser: In many sections of the Province you will find that experience varies very much in regard to alfalfa; some grow it successfully, others cannot. In that case, would it be wise to go to the farm where it succeeds and get soil from there?

Prof. Spillman: If the plant growing there has white nodules on the roots, then the field is inoculated, and it will certainly pay you to take dirt from that field, say two bushels, and distribute it on the land that has failed to produce a crop.

Q.: With regard to clay, I have had success on the heaviest clay; in fact, it does better there than anywhere else. This opinion was confirmed by several other members.

Prof. Spillman: It may be that your colder climate will cause a clay soil to behave differently from what it does with us. The point is that the reason it does not thrive on a very heavy clay soil with us is that such a soil is liable to be water-soaked.

Prof. Zavitz: In Ontario it seems to depend more on the sub-soil than on the surface soil.

Prof. Spillman: I refer to the sub-soil, not the surface soil; to the drainage of the soil.

Prof. Harcourt: I know of a field that has been in alfalfa for ten years, that has a heavy surface clay and a heavy sub-soil clay, and I know that in digging for a well they found the roots in the stiff clay seven or eight feet down in the ground, and the roots were large enough to make lines of demarcation in breaking up ground. That field produced three crops a year. It is not on a hill face, but rather low lying, but it drains out. I do not think it matters so much what the surface soil or the sub-soil is, so long as it drains out properly.

Prof. Spillman: I see that we are differing in the terms we apply to soil. When you get south of the glacial drift there are soils that take a week to wet and a year to dry. What we call a clay soil down there does not behave at all like the soils I have described. We call such a soil as you describe a clay loam.

In regard to feeding alfalfa to horses, if they are fed exclusively on alfalfa hay, they are liable to kidney disease. If they are fed alfalfa only once a day there is no difficulty about it. There are thousands of horses in the west that never eat anything but alfalfa, but in that region it is common to have horses die of kidney disease.

Q.: Is there any difference between the first and second cut in this respect?

Prof. Spillman: There is a great difference of opinion on that point, and it has never been settled. The time to cut alfalfa for hay is the time it has begun to bloom. The curing is difficult because it sheds its leaves very rapidly as it gets dry. The hay should be put up in rather large cocks before it is dry and allowed to cure there, and be put under shelter just as soon as it is dry enough not to heat. Experience is the only thing that can tell you when it is dry enough not to heat. You may spoil some alfalfa hay when you begin.

For cows I will say that if I were feeding hay, I should prefer to feed alfalfa hay rather than any other. I feed them straight alfalfa, and if I feed a little grain with it I think it is the finest ration a cow can eat. Alfalfa hay and five, six or seven pounds of cracked shelled corn a day for a cow in full milk is an excellent ration; it will save half your grain bill.

Q.: How will it do for silage?

A.: It makes very fine silage, and is very easy to handle. For hogs it is my preference of all the pastures I know of. If hogs are put on alfalfa and given no other feed at all, they make an enormous growth of bone and muscle, and apparently a good growth of fat, but the fat is water, and not oil, and if you put it in the pan to fry, it will boil, instead of fry. If you want to produce hard bacon, you must feed grain or something else along with the alfalfa. In the United States our packers pay no attention to whether the bacon is soft or hard; we do not know any difference between high-class bacon and second-class bacon; we eat our own bacon. I imagine that peas and barley along with alfalfa would make hard flesh. At the Kansas Experiment Station they fed their hogs on chopped alfalfa hay through the winter, and wintered them nicely. Governor Hoard, of Wisconsin, tried the same experiment, and says that it is now his regular feed for brood sows during the winter.

Q.: How does he feed it?

A.: In the trough.

Q.: Is it soaked?

Prof. Spillman: I do not know; I do not think that is a matter of much importance. It is also good for chickens.

Mr. Clark: I had twenty acres of alfalfa and pastured my stock on it all summer, and had no trouble with bloating.

Prof. Spillman: There is one section of our country where on the uplands I never knew of a case of bloat. But an alfalfa field is too valuable to allow sheep or cows upon it, because they will kill it out if they pasture it at all closely.

Q.: What about its place in the rotation?

Prof. Spillman: We have a noted farmer named Joseph Wing, of Ohio. He has a very simple rotation, namely corn and alfalfa—four years of alfalfa and one of corn. He says the only reason he grows the corn is that the grass invades the alfalfa crop and he had to plow it up, but he got one hundred bushels of corn to the acre right afterwards. When he has got rid of the grass he goes back to alfalfa. He sows alfalfa and brome grass and uses it for pasture. It will keep six times as much stock to the acre as blue grass.

Q.: How much seed is required?

Prof. Spillman: Twenty pounds to the acre; a little more in the Eastern States.

Mr. Holtermann: Have you had any experience with sainfoin?

Mr. Spillman: I have seen it a good many times and have grown it a few times; in general I regard it as a failure in the United States. Sweet clover is one of the best honey plants.

MACDONALD-ROBERTSON SEED GROWERS' ASSOCIATION.

By G. H. Clark, B.S.A., Ottawa.

Good work has been done along various lines by the Dominion Department of Agriculture, and by some of the Provincial Departments of Agriculture in Canada, with a view to encouraging the use of high-class seed of the best varieties of farm crops. From what I have observed, I believe that for a large share of the improvement in field crops in the Province of Ontario, much credit is due to the efforts of Mr. Zavitz. The total value of agricultural crops grown in this Province—which is now estimated to be in the neighborhood of $150,000,000—has been increased, to a great extent, through the work carried on in connection with this Agricultural Experimental Union; but there is yet room for a considerable increase in the average yield of common field crops in Ontario by the use of better seed grain.

I expect that the object of forming associations of seed growers is not perfectly clear to all. The idea may be new in Canada, but there are associations of seed-growers in other countries that have done good work. Many of you, doubtless, are acquainted with the operations of the "Illinois Seed Corn Growers' Association." The benefits derived from associations of breeders of live stock are also pretty well understood. Those associations have rendered valuable service in the improvement of live stock. The advantages to be derived from organized efforts on the part of seed-growers are not dissimilar to the advantages which breeders of pure-bred live stock get through the medium of their associations, and the general operations of an organization of seed growers may be carried on in a manner similar to those of live stock associations.

Associations of breeders of pure-bred live stock fix a minimum standard which must be attained in order that animals produced will be recognized by the association as being pure bred. In fixing standards of perfection for pedigreed animals the principles which underlie improvement are recognized. The same principles that are applied in the improvement of animals are also applied in the improvement of varieties of farm crops. Heredity is the lever by which improvements are made, and on which breeders of either plants or animals depend to fix desirable characteristics; but this law that like begets like must be taken in its broad sense, because it would not be possible to make improvement if it were not for the tendency toward variation. Heredity, and a tendency towards variation, can be turned to good account in the improvement of plants equally as well as in the improvements of animals, but, unfortunately, few farmers make any attempt to systematically apply those principles in the improvement of things that are smaller in size than a hog.

Heredity and variation in improved varieties of field crops tend toward reversion to the wild types from which they evolved; but when improved sorts of field crops are provided with environment best suited to their growth and a continued selection of the most desirable ones be applied, then this natural tendency toward reversion is overcome. It follows then that our improved field crops, as well as our highly-bred animals must have kindlier treatment in order that they may yield their powers of self-defence with which nature endowed them. Though it is highly important that the variety of grain be well suited to the locality where it is to be grown, too much faith has been pinned on the names of varieties, without due attention being given to the quality of the seed itself. It is not always recognized that there may be as much difference between two strains of seed of the same variety of grain as there is between two distinct varieties, as far as the capacity of the seed to give a large yield of grain of good quality is concerned. It is therefore not only important to use seed of the best variety, but it is also equally important to use seed of that variety that has had kindly treatment and continued selection for several years In the production of good paying crops the cost of the seed is small, but the influence of the seed is great. The mere fact that grain is plump and free from impurities is not sufficient proof that it is seed capable of giving a good crop. Breeders of poultry do not pay much attention to the size of eggs for incubation; they want, first of all, to know something about the good qualities that the germ in the egg has inherited from the parents, and not only from the parents, but from the bulk of the ancestors. It is equally important that seed be taken from a crop in which the individual plants have had an opportunity to attain a maximum vigor and yield per plant, and it is just as important to have definite information about the crops, and how the work of selection was carried on for several preceding years, as it is to have a knowledge of the ancestors of breeding animals. In consideration of these principles which underlie improvement in common grain crops, and in view of the limited supply and growing demand for high class, pure seed grain, an effort is being made by the Department of Agriculture at Ottawa to unite the efforts of farmers who make seed growing a special industry in their farm operations and form an association that will operate for the mutual benefit of seed producers and seed consumers.

The general plans of procedure which led up to the formation of the Macdonald-Robertson Seed Growers' Association were outlined to me in April, 1900, by a man whom I know to be given to habits of meditating on matters pertaining to the progress of agriculture and of the people of Canada. I refer to Prof. Robertson.

To go back to the beginning of the association, a seed grain competition was started in the spring of 1900 among farmer boys and girls, who, during a period of three years, each operated a seed grain plot of one-quarter of an acre, according to a system outlined for their guidance by Prof. Robertson. Over fifteen hundred competitors commenced growing seed of wheat or oats, according to that system, but before the competition was finished more than one-half of them had tired of the work and dropped out of the competition. I have visited many of those who continued with the work throughout the three years, and can say that, with some few exceptions, the competitors were encouraged in their work of selecting seed grain by parents who are among the best class of farmers in the localities where they live. Many of those farmers are now members of this association.

The Macdonald Seed Grain Competition closed with 1902, and in the spring of the present year Prof. Robertson invited those farmers who were directly interested in that competition, and also other farmers who were interested in seed growing, to form themselves into an association of seed growers. Provisional rules were drafted for the guidance of members for 1903; these will be considered and revised at the first meeting of the officers of the association for the Dominion. Copies of these rules may be had on application to the Seed Division, Department of Agriculture, Ottawa.

There are now seventy-four farmers in the Province of Ontario who are members of the association. With a few exceptions they have been visited and their work inspected during the past season. Each of them produces seed for his general crop on a small, specially cultivated plot, ranging in size from one quarter of an acre to two acres of land. It is recommended that in sowing those plots the seed be sown thinly. The individual plants are thus given more room to "stool out"; the plants get more moisture and more food, and they are more vigorous and have larger and better filled heads of grain. When a grain drill is used in sowing those small plots, it is advisable to plug every other tube of the drill, thus making the drills of grain fourteen, instead of seven, inches apart. The object is to obtain the maximum vigor and large heads of grain.

From these small seed plots enough of the largest heads of grain are picked by hand each year to get seed to sow the seed plot of the succeeding year. For this purpose forty-five pounds of wheat, twenty-five pounds of oats, forty pounds of barley, or ten pounds of corn are considered sufficient for an acre of land. It should not take more than four hours, with two persons, to select by hand enough good seed for an acre seed plot, and the grain so selected can be threshed by hand.

The members of the association use the grain that is harvested in the regular way from the hand-selected seed plots to sow on a large field after a summer fallow, after a hoed crop, or following in rotation after clover or other leguminous crop. They have the grain produced therefrom to sell for the purpose of seed. In this way the rules of the association require of seed growers that they provide, as far as possible, a favorable environment for the growing crop, and also that they turn the natural tendency toward variation in plants to good account by following a continued system of hand-selection.

According to the provisional rules of the association, seed grain that is pure, true to variety, and has had the benefit of this system of careful growing and continued selection for three consecutive years, is recognized as improved seed. The operations of members who are seed producers are closely inspected and records are kept of the amount and pedigree of the seed they produce each year. It is proposed to issue a catalogue for general distribution each year, in which the names and addresses of members may be given, together with the kinds and varieties of seed produced by them, the pedigree of the seed, the amount of seed for sale, and the price per bushel. It is also proposed to supply members with association certificate forms, having printed thereon the rules of the association, with which members are required to comply in the production of seed. Purchasers of pedigreed seed may obtain one of these certificates of registration with seed bought from a member; the signature to the certificate of registration would be a guarantee, on the part of the member, that the seed supplied had been produced in accordance with the rules printed on the certificate. The purchaser would then have an opportunity to verify the pedigree of the seed by having it registered.

The work of organizing this association has, to some extent, been retarded by the illness and consequent absence of Prof. Robertson. According to the present plans, the organization will consist of an advisory board, comprised of men selected from each of the Provincial associations. The advisory board will make general regulations and direct the operations of Provincial associations, control the registrations of pedigreed seed, and otherwise advance the interests of associations. The more important work of the organization will, however, be carried on through the medium of Provincial associations; their scope for useful work is practically unlimited. The operations of producers of pedigreed seed require to be carefully studied by some competent persons acting in the capacity of superintendent. It is expected that the superintendents of Provincial associations will have direct charge of enforcing the rules, preparing annual catalogues, arranging for holding seed fairs, and otherwise advancing the interests of seed producers.

I trust that the farmers of the Province of Ontario appreciate the need for a few farmers to make a specialty of growing high-class seed in every agricultural locality, and that the efforts of this association of seed growers, in an endeavor to further encourage the production and more general use of high-class seed of all kinds of farm crops, will meet their hearty approval and support.

Mr. L. H. Newman, B.S.A., Ottawa: At the present time there is a great deal of scientific thought centred in the cultivation of the soil but much less stress is laid on the value of high-class grain for seed. The seed producer has been slow to recognize that plant life is in a large measure within his control. During the past number of years much valuable work has been done by Mr. Zavitz in establishing good varieties, and in many cases farmers have taken advantage of that knowledge. But this is not enough; there is no guarantee that when good varieties are introduced they will continue to be good varieties in general cultivation on the Ontario farms, for no selection is made between inferior and high-class grain for seed. That is the reason why in so many cases we hear that seed has run out, that a change is wanted, etc. Farmers should be taught to select their seed right in the field. There they have the advantage of having a large number of plants to select from, and of knowing the plants themselves, which is of primary importance. The principles governing the selection of seed are similar to those employed in selecting live stock. It is safe to assume that such characteristics as vigor of growth, and productiveness, etc., are transmitted from the parent to the seed, just as surely as in the case of animals. It is safe to assume that by systematic selection the yields of our present varieties may be increased very largely from what they are at the present time.

What does this work mean to the Province? The present census gives 110,000,000 bushels of oats for the past year, which, at 30 cents per bushel, would mean about $33,000,000. If the highest class seed had been used, we may easily suppose that the yield would have been increased by twenty per cent., which, at the same price, would mean a total value of about $40,000,000, instead of $33,000,000. When we consider what has been done in plant breeding, and in building up varieties in this and other countries, it is safe to assume that there is no limit to the betterment of plant varieties. We now have a number of farmers in the Province who are endeavoring to produce high-class seed. During the past summer I had charge of the work of inspecting the plots in the district west of Toronto. In most cases the men are becoming very enthusiastic and are doing excellent work. One man said: "I am making quite a reputation for myself. When I started this work, my neighbors laughed at me, but now they are coming to me for seed, and I have sold over 200 bushels during the past year at 75 cents per bushel, and could sell almost any quantity." But it is only by a process of education that the farmers over the country generally can be induced to produce such seed. Even if you do not wish to produce high-class seed for sale, the profits you will reap from sowing such seed on your own farm will be very apparent.

Dr. Jas. Mills: It was with great pleasure that I listened to Mr. Clark's remarks regarding the attempt that is being made to secure improved varieties of seeds by selection and breeding. The Union has done a great work in testing varieties. It is a work that is worthy of more attention both here and elsewhere. I believe it is possible to improve the standard in plants by selection and breeding, just as it is in live stock.

SEED INSPECTION BILL.

Mr. T. H. Mason: During the last two or three years we have heard a great deal about the defects of the seed trade in Ontario. When the seed laboratory was established at Ottawa, samples of seeds were obtained from all over the Province and analyzed, and the results were a revelation to the farmers. At the last session of Parliament the Minister of Agriculture introduced a bill, which was pretty thoroughly threshed out in the House, and was laid over for future consideration until the coming session. One section of the seed trade has given the bill the strongest possible opposition, while another section of the trade is in favor of it. The feeling of the people is very strongly in favor of the measure. I do not think we should let an opportunity like this pass without placing ourselves on record on the subject.

After the provisions of the bill had been explained by Mr. G. H. Clark, the following resolution was moved by T. H. Mason, seconded by W. B. Roberts: "That we, the members of this the Ontario Agricultural and Experimental Union, hereby express our approval of the principles embodied in the bill respecting the 'Inspection and Sale of Seeds,' that was recently introduced into Parliament, and ask the Honorable, the Minister of Agriculture for Canada, to urge upon Parliament, without unnecessary delay, the necessity for the adoption and application of those principles which we believe will materially serve to protect the farmers of this Province from evils connected with the commerce in agricultural seeds.

THE CHEMICAL COMPOSITION OF SOME INSECTICIDES FOR THE POTATO BEETLE.

By Prof. R. Harcourt, Agricultural College, Guelph.

It would appear that the number of enemies of cultivated plants is either increasing or the attacks are much more energetic than formerly. This may be due to the greater ease with which most of the injurious forms can pass from one part of the country to another, or to the fact that in many cases the plants are not as strong and vigorous as in former years, and thus less able to withstand the attacks of their enemies. Whatever may be the cause for the greater ravages of insect and fungous pests, the farmer and fruit grower of to-day finds the use of insecticides and fungicides indispensable to the production of a crop of good quality, or, indeed, in many cases to the production of any crop at all. It is impossible for him to fence out the many forms of pests which seek to share with him the products of his labors. In many cases his foes are invisible—foes which he does not understand and which he is at a loss to know how to combat. In other instances his enemies may be visible enough, but swarm over the field in such immense numbers that he must have some quick, effective method of dealing with them or his whole crop will be destroyed. This condition of affairs has brought into the market a very large number of insecticides and fungicides, all of which are said to produce wonderful results. Without a doubt, many of these substances will fulfil, at least fairly well, the claims of the manufacturers. There are some, however, that contain so small an amount of anything that will destroy either insects or fungi that they are practically worthless, and for that reason commerce in them should be discouraged.

It is not the intention in this paper to deal with all the insecticides and fungicides that have come into general use; but simply to treat a few of those used in fighting the potato beetle. One of the most important of these is Paris green. Paris green, if perfectly pure chemically, is a compound made up of three substances—arsenious acid, acetic acid and copper oxide—in chemical combination called copper aceto-arsenite. These three substances should be present in the following proportions :

Arsenious acid	58.65 per cent.
Copper oxide	31.29 per cent.
Acetic acid	10.06 per cent.

Because of faulty methods of manufacture, however, and also because arsenious acid is cheaper than the other constituents of Paris green, large amounts of this substance are sometimes present in an uncombined condition. The free arsenious acid is soluble in water, and will cause great damage to the foliage by scorching. To overcome the injurious effect of the free acid, lime is usually mixed with the Paris green in water. Very frequently, however, the two substances are not left long enough in contact with one another to allow the lime to combine with the arsenious acid and scorching of the leaf follows its application to the plant.

Another method of adulterating Paris green is by the addition of gypsum or clay. It is hardly necessary to state that these substances are absolutely worthless as insecticides, and are only added to give weight. However, in Bulletin No. 88 of the Inland Revenue Department, Ottawa, dated July 31st, 1903, Thomas Macfarlane, Chief Analyst, states that out of 161 samples of Paris green collected in various parts of the Dominion, only 4.2 per cent. were adulterated. He also states that it seems that an improvement has been taking place during the last ten years in the quality of the Paris green sold in Canada. The percentage of the total number of samples collected at different dates found to be pure were as follows:

1894	72.2 per cent. genuine
1895	89.1 per cent. genuine
1902-'03	95.8 per cent. genuine

On the other hand, we found as a result of work done in our own laboratory on 23 samples of Paris green, collected principally from country stores in the early part of this year, that 82.6 per cent. of them were more or less adulterated.

London purple is another arsenical insecticide sold in considerable quantities in this country. This substance is prepared by boiling a purple residue from the dye industry, containing free arsenious acid, with slacked lime. In case not enough lime is added to the dye residue or the boiling not continued long enough, some of the arsenious acid will be in the free condition, thus causing the foliage to be scorched. Because London purple is made from a by-product, therefore, not as pure a poison as Paris green, and because too much lime used in neutralizing the arsenious acid becomes an adulteration, and too little allows free acid to be present, it is not as reliable as poison as Paris green.

Lead arsenate is probably the most insoluble of all the arsenicals used as insecticides, and, consequently, is the least liable to scorch foliage. The lead arsenate is mixed with a quantity of organic matter, principally sugars, to cause it to stick to the leaf. Practical tests with this insecticide show that its action is excellent, and that on account of its almost entire insolubility it seldom scorches the leaf. It requires about four pounds of this substance, as usually found in the market, to furnish as much arsenious oxide as one pound of Paris green.

During the last few years there has been a number of insecticides, depending on arsenic for their poison, placed on the market. Some of these are said to act both as an insecticide and a fungicide, and to supply plant food. As these substances may be bought for much less than Paris green, they have found a ready sale. We gathered a number of these mixtures from merchants in Guelph, and submitted them to analyses for the purpose of ascertaining just what they do contain. The results obtained correspond very closely with those reported elsewhere.

The sample of Black Death examined was found to contain copper oxide and arsenious acid equivalent to .43 per cent. of Paris green. The balance of the material was sand, charcoal, gypsum, and limestone. In other words, there was less than a half-pound of Paris green in 100 pounds of the mixture. It would therefore require over 200 pounds of this insecticide to furnish one pound of Paris green. It is sold for 2 cents per pound, or 15 pounds for 25 cents.

Bug Finish, another of these insecticides examined, contained copper and arsenic equivalent to 1.06 per cent. of Paris green. No other substance that would destroy insects was found. The principal materials used for "make weight" were sand and gypsum. This insecticide is sold at the same rate as Black Death.

Kno Bug is the name given to another mixture which the manufacturers claim will not only kill the bug, but, unlike Paris green, it acts as a vegetable tonic and stimulates the growth of the plant. The sample analysed contained copper and arsenic in sufficient quantities to amount to 2.49 per cent. of Paris green. It also contains 4.50 per cent. of potassium nitrate. The latter is certainly a plant food, but, as we understand the physiology of plants, none of it would be absorbed by the leaves, and must fall to the earth and be taken up by the roots before it would be of any benefit to the plant. Under these circumstances it would seem better practice to keep insecticides and fertilizers separate. Kno Bug is sold in 20-pound boxes, at the rate of 6 cents per pound.

Slug Shot was found to be composed almost entirely of crude gypsum, with copper and arsenic equivalent to 2.13 per cent. of Paris green. There is also present small quantities of sulphur, carbolic acid, and tobacco. The latter substances are of value as insecticides and fungicides, but 10 cents per pound, or 3 pounds for a quarter, seems like a big price to pay for such a mixture.

It may not be fair to value Slug Shot solely on the basis of the Paris green it contains, for carbolic acid is a poison ; but, for the sake of comparison, let us see what Paris green costs in these four mixtures. Calculating on the basis of the percentage of this poison as given below, we get the following figures :

Cost of Paris Green in the Various Insecticides Examined.

Material.	Per cent. of Paris green.	Cost per pound.
		$ c.
Paris green	95.00 : 20 cts.	0 21
Black Death	.43 : 1⅔cts.	3 86
Bug Finish	1.06 : 1⅔cts.	1 56
* Kno Bug	2.49 : 6 cts.	2 41
† Slug Shot	2.13 : 6 cts.	2 81

* Also contains 4.5 per cent. of potassium nitrate for which no value is here shown.
† Also contains carbolic acid and tobacco for which no value is here shown.

Another insecticide, not depending upon arsenic for its poison, that has been sold in large quantities in the Province during the last few years was analysed. This insecticide, known as Bug Death, is said to kill bugs, feed the plant, increase the yield, and improve the quality of the potatoes. It is practically an impure or commercial zinc oxide. The only constituent present of any fertilizing value is nitrogen, of which there is less than two-tenths of one per cent. It, therefore, cannot supply any material amount of plant food. It appears to have a very strong fungicidal action, and has given good results in actual practice. It is sold at 15 cents per pound, or in 100-pounds lots at 7 cents per pound.

It would appear from the above facts that some of the insecticides now on the market are not of sufficiently high quality to be recommended for general use.

Q.: What is Paris green adulterated with?

Prof. Harcourt: Most commonly with gypsum, road dust, etc.

Q.: Is there a preparation used in the United States called White Arsenic, that is perfectly soluble?

Prof. Harcourt: I do not know of White Arsenic being used by itself as an insecticide. White Arsenic in water forms arsenious acid, which would scorch the leaves of the plant to which it may be applied. The destruction of foliage by Paris green is due to this substance. White Arsenic has been used successfully when boiled with lime, formng calcium arsenite, thus neutralizing the acidity of the acid. Prof. Taft, of Michigan, suggest boiling one pound of white arsenic and two pounds of lime in two gallons of water for forty minutes, and then diluting as required. One pound of arsenic combined in this way may be used as a substitute for two pounds of Paris green As a matter of precaution, it is better to add an additional pound of lime for every pound of arsenic when diluting for the spray tank.

Q.: Have you had any experience with chemicals for the destruction of weeds?

Prof. Harcourt: You refer to the use of copper and iron sulphates?

A.: Yes, and arsenic, too.

Prof. Harcourt: I have had no personal experience with the use of chemicals for this purpose. The Biological Department has demonstrated, both in this neighborhood and in various parts of the Province, that copper sulphate will destroy mustard. They have also used chemicals successfully in destroying other weeds; but I do not know the details of their experimental work.

Q.: You spoke of Bug Death; how does it compare with Paris green in cost?

Prof. Harcourt: It costs more than Paris green. I think last year Mr. Zavitz reported that the Paris green applied in his experiments costs 60 cents per acre, and the Bug Death $7.65 per acre.

Q.: As a fungicide is it as good as Bordeax mixture?

Prof. Harcourt: In some experiments carried on here it has given better results than Paris green and Bordeaux mixture combined.

Q.: How much Paris green would you use to the acre?

Prof. Harcourt. About a pound. Some complain that they have of late years had to increase the quantity, saying that years ago they had to use only eight to twelve ounces. When Bug Death first came out across the line, several of the experiment stations tested it. One State reported that they used 100 lbs. per acre and got no results. Since then the same State has reported favorably of it, using 20 to 30 lbs. to the acre.

Mr. Zavitz: We started eight years ago to experiment with insecticides for the potato beetle. We now have the results of eight years' tests, which are interesting and very suggestive. Two years ago we added the Bug Death to the list of insecticides which had been tested previously. The average results are as follows:

Treatments.	Yield of sound potatoes per acre.	
	Average, 8 years	Average, 2 years
	bus.	bus.
Nothing	81.0	96.3
Potato Bug Finish	124 5	136.8
Paris green and plaster	130.9	148 7
Paris green and water	138.2	148.1
Bug Death dry	....	194 2
Bug Death and water	....	178.2

Q.: Is there any more labor in applying Bug Death dry than with water?

Prof. Zavitz: Rather more labor than where we used the spray pump.

Q.: Can you give the comparative cost of treating an acre of potatoes with Paris green and Bordeaux mixture? I notice that in the report of the Experimental Farm at Ottawa, the cost appears to be about $9 per acre with Bordeau mixture.

Prof. Zavitz: At our Union meeting last year, Mr. Macoun stated that it had cost them about $8 per acre for the material, while Mr. Harold Jones reported the cost of material used by him at about $3 75 per acre.

Mr. Mason: In a wet season it is necessary to make more applications than in a dry one, which would make considerable difference in the cost.

ONTARIO FARM STATISTICS.

By C. C. James, M.A., Deputy Minister of Agriculture, Toronto.

I think that Canada claims the honor of having the longest series of properly-taken censuses of any country of the world.* When Canada was not Canada—when she was New France—it was one of the duties of the Governor to send home regularly a statement of the inhabitants and their productions. For some two hundred and forty years we can go back, decade by decade, and from these census returns we can trace the history of the growth and development of this country; and in the early days the agricultural products played a very important part in that development.

Is the collecting of information in regard to the farm work of this or any country a matter of any importance? Some years ago we very frequently received, instead of the information we desired, some very severe criticisms of the work we were engaged in. Farmers who were intelligent and ought to have known better, would write us and say: "You are wasting money in collecting and publishing agricultural statistics. Why should you collect this information, and place it before the people, in order that the wealthy grain buyers may take advantage of it, and cut down the price?" I have written many a farmer in the earlier years of the work in Toronto, trying to answer this argument. I have told them that, even if we did not gather and publish this information, the great grain buyers would collect it, and they do now collect it for themselves, and that our work was done to help the farmers' end of the enterprise. Again, no industry so widespread as the agricultural industry can afford to have its operations concealed. This industry is so general and so important that it must be, in the long rung, at least, to its benefit to have its true state of affairs published from time to time. From the Provincial or national standpoint it has also seemed to be a matter of very great importance that the best and most reliable statistics in regard to agriculture should be continually kept before us. It is our greatest industry. We would think very little, indeed, of the business ability of a great firm that did not from time to time look over the state of its affairs and strike a balance. We do not pretend to go very fully into the business affairs of the farmers of this Province, but we think we are doing some good—that we are bringing before them some valuable information—in trying to find out whether from year to year they are making progress or going back.

"How are the crops this year? How are the farmers getting on?" When the fall of the year comes around, that is the question on everybody's lips. "What is the condition of the crop?" "How are the cheese factories turning out?" How are the farmers doing." That is the key of the whole situation. If they are all right, then it is all right with everybody else. So I say it is important that we try to get as clear and as correct an idea as possible of how the crops of the year are, and how the farmers of this country are continuing from year to year.

In 1846, there was organized in this Province, by the representatives af various agricultural societies, what was known as the Provincial Agricultural Association, out of which was formed a body known as the Bureau or Board of Agriculture. That body carried on work of various kinds for forty odd years. In 1882 the Provincial Government, however, considered that some part of the work at least should be more carefully systematized, so there was incorporated as a sub-department of the Government what was known then and has since been known as the Bureau of Industries. When a Department of Agriculture was formed, some seven years later, it was built upon these two agricultural foundation-stones. It took the work that had been carried on up to that time by the Board of Agriculture and united to it the statistical work carried on by the Bureau of Industries.

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* Vol. IV. of the Census of Canada 1870-71 contains abstracts of the various consenses of Canada and New France, commencing with 1665-1666.

I told you a few moments ago that our Canadian census returns could be traced back for a period of nearly two hundred and fifty years, and the question may at once arise in your minds as to what is the difference between the statistical reports to which I am referring and the census reports. Briefly this: the census is taken every ten years, and is nothing else than an addition or sum total of the work of all the individuals of the country. Our statistical work, about which I am speaking, is more or less an estimate based upon a smaller number of returns and is carried on from year to year. You may therefore turn to the Dominion census figures to find out certain information in regard to the agriculture of this country, and you find it only for every ten years. Our returns, however, go back to 1882, and we have them complete for every year since then. They are largely estimated, as I have said.

Now a few moments to explain to you briefly how these estimates are made. I might tell you, for instance, that last year the farm property of this Province was valued at $1,044,000,000. The question may at once arise as to how these figures are arrived at. How do we find out the value of the wheat and other crops, or the value of the live stock, etc., which altogether foot up to so many millions of dollars? To start out with, we have the annual municipal assessment returns, and according to statutory requirements, these are sent to our office every year. The assessor, when he goes around, takes a careful statement of the area of every farm. When these returns are received by us, we compile them, township by township, until we arrive at the entire assessed area of the Province. That is the first thing we start on. Then for a great many years, the assessors have also been asking, "How many acres of wheat have you? what numbers of live stock?" They are still taking these figures, but they are of little use to us. So we make use of simply the total area. Then, we have, distributed throughout this Province, two thousand correspondents. This is a list of men whom we have carefully selected. They are our trusted correspondents. Three times a year we send them circulars asking for information in regard to the condition of the crops, and the condition of labor and wages, the state of their live stock, etc., and from these returns we compile and publish three bulletins during the year, in May, August and November. The farmers of the Province, however, number one hundred and seventy-five thousand. If we were making a census of their products, we should ask the individual farmer for the results of his year's operation. We do not aim at that; we leave that to the Dominion census. If we were to send out circulars asking for information from these hundred and seventy-five thousand farmers, we might receive replies from one out of every ten; the great majority would not find time to answer, a large number would be utterly indifferent to it, and to a great many the difficulty of sitting down and writing a letter is greater than that of half a day's work in the field. We gradually accumulated a large list of farmers upon whom we could more or less depend for our returns. We got these names largely through the assistance of Public School teachers. They sent us the names of such farmers in their school section as they thought would be sufficiently interested and sufficiently intelligent to send us returns. To these we send once or twice in the year our card, asking for certain information. In June we ask for the area of the farms, the number of acres under various crops, the value of the farm, and the number of live stock. Suppose that from the assessor's figures we have found out there are thirty or forty thousand acres of farm land in a certain township, and from so many farms we have got a total acreage of say two thousand acres, with a sub-division of so many acres for wheat, oats and barley, it then becomes a mathematical calculation to make an estimate. Every return is carefully examined, and if it carries on its face anything that arouses suspicion, it is at once cast aside; so that an attempt is made to keep well within the mark, and allow no returns to go in from anyone who wilfully tries to mislead us. After that, we figure out the total area in the various crops, the value of the entire farm, and the number and value of the live stock. Then we must estimate for the year the amount of the various crops produced. In the month of July we send out our returns, and ask for an estimate before the crops are harvested, and later, in October, when threshing has begun, we send out our cards once more to get returns from the actual threshing result. By compiling these we gradually are able to put together and publish for general information the figures which we put forth in the form of our annual report. But you might read page after page of that report, and conclude that there was very little to interest or benefit you in it. Let me refer, however, to a few things which will indicate the progress or change in conditions that has taken place within the last ten years in the Province. First, take wheat: We find that the farmers in Ontario to-day are able to produce just as large crops of wheat as they were ten, twelve or fifteen years ago. We find at the same time that the area given to wheat has been gradually decreasing; that we have been passing out of the condition when wheat was king. It makes but little difference to-day to the farmers of Ontario what the condition of wheat is, or what the market price is, in comparison with the other crops that are being grown. When you turn to barley and oats, you will find that there has been a gradual increase in the acreage and the total yield; and so with a number of other crops. Turning to live stock. let me give you a few figures to show you something that will be of importance in connection with the great live stock industry in the Province. The value of horses on the farms is about $55,000,000, and the anual sales amount to $5,000,000. These figures in themselves count for very little; they count for a great deal if beside them you are able to place figures referring to any other industry. In cattle, the total value on the farm has grown step by step until it has reached $65,000,000, and the annual sales $25,000,000. Sheep have remained stationary for a few years, although for a number of years before that there was a decline. Their value at present is $8,000,000, with annual sales amounting to about $3,000,000. In swine the value has grown in a few years from $6,000,000 to $12,000,000, and the annual output has increased from $10,000,000 to $20,000,000. Poultry have also increased. Adding these together, we find that the total value of the live stock on the farms of Ontario to-day amounts to somewhere between $140,000,000 and $150,000,000. You will see now, perhaps, why it is that the exhibition that is being held in the city of Guelph attracts the attention of the growers of live stock throughout the Province, and also of the financiers and the men who are supposed to have their hand on the pulse of this country, and are as much interested in its welfare as the farmers themselves. I could speak of the butter and cheese industry, but let me give you a few figures, summing up the whole thing as far as the total value of farm property is concerned. In 1893, farm property in Ontario was valued at $970,000,000. The next year at $954,000,000, the next year at $931,000,000, the next year at $910,000,000. and in 1897 at $905,000,000, showing that year by year there was a steady decrease in the value of the farms of the Province, which in the period mentioned amounted to no less than $65,000,000. In 1897 the upward movement began, and for the succeeding years the figures read as follows:—1897, $923,000,000; 1898, $947,000,000; 1899, $974,000,000; 1900, $1,001,000,000; 1901, $1,044,000,000.

For the last six years our books show that the agricultural interests of this country have been increasing in value by millions upon millions. The total agricultural assets are going ahead. If you look around and ask why—what has taken place—you will find the secret is that we have been developing our live stock interests and our cheese interents, and while these have been advancing, the other departments of our agricultural work have not been falling behind. While we have been increasing the output of live stock and cheese, our great crop-producing capabilities have been going ahead at the same time. The productiveness of the soil of the country has been increasing. Wheat has gone back step by step, and other things have taken its place, such as barley and oats, which help out the great live stock industry. The condition to-day is better than it has been for twenty or twenty-five years. If you go to the conferences held in connection with our live stock and dairy industries, or our fruit-growing industries, you will find a keenness of interest amongst those in attendance, and a general air of prosperity about them such as we did not know a few years ago. If you ask why this is the case, my answer to a large extent would be this, that the patient work done year in and year out by our agricultural organizations and institutions, which was not recognized for many long years, began gradually to make itself felt on the agricultural mind of this country; and I think I would put first among the influences that have contributed to this the work of the Agricultural College, which has been so well carried on by the staff, under the capable direction of the man who sits here as chairman to-night, Dr. James Mills.

FARM MANAGEMENT.

By Prof. W. J. Spillman, Agrostologist, U. S. Department of Agriculture.

I think I may truthfully say that this Union is the most successful affair of its kind on the American continent. We, across the line, have always wondered how the thing was done; how it was possible to get so large a body of farmers to conduct the careful experiments which the members of this Union are called upon to conduct. We have had much difficulty in doing similar work, and I must confess that I do not yet fully understand how it is done. When I attempt to get the United States farmer to put in experimental plots, he says, "I do not want to fool with these little plots; if you want me to experiment, let me sow ten acres"; but that is not an experiment. In order to make an experimental test, it is absolutely necessary to have the area small enough to insure uniformity of the soil. We are trying across the line to copy from you, and build up a Union such as you have. In those States that have good Colleges like you have at Guelph, we are succeeding. Where we have a few men who graduate from those Colleges, and then go back on the farm, we can get these men to carry on experiments, and a few of their neighbors also; so that in Ohio, Michigan, New York, and in some other States, we are developing a system of investigation upon the farm very similar to that which has been so successful in Ontario. Not only is your Union known across the line, but your College is very well known, and a great many of the Colleges over there have on their staff graduates of Guelph, and many of these graduates have made distinguished names for themselves among the agriculturists of the United States.

When I was a boy on the farm I conceived the idea of going away to school. On the farm where I was brought up, it was the custom to start to the field at seven o'clock in the morning. We quit very promptly at noon and rested an hour, and then worked till 6 o'clock in the evening. We lived considerably farther south, and the winter days were not as short nor the summer days as long as they are here. We made a living, however, even if we did not work more than nine hours a day. When I decided to go to College I was raking and scraping together enough to pay my expenses, and I decided that after we had finished our fall plowing I would hire out to a neighbor and earn a little more money. I went to one of our neighbors and engaged with him to do some plowing. The farm on which this neighbor lived was one of the best in the country, and the man who preceded him had made a fortune off it and retired. Mr. Brush, who had rented the farm, had expended considerable money, and had bought six good horses, five good cows, and farm machinery. I went down at 6.30 in the morning to start work, and when I arrived there were a number of furrows plowed around the field. When he came around, he said: "You are a little late"; and I asked him when they began, and he replied, "At four o'clock in the morning." I said, "Do you expect to make a profit on this farm?" He said, "If hard work will do it, I do." He was plowing about two and a half inches deep. What were the results? Two years later Mr. Brush had two old, worn-out horses, his cows had all been sold, or had starved to death, and finally he moved into Indian Territory, where a man could brand cattle enough to keep the wolf from the door. He is now in a poorhouse in the North, and his wife and the rest of the family are dead. This is the best illustration I have of the man who believes that farming consists of hard work. He was going to make a living on that farm if hard work would do it. I want to tell you that hard work alone will not make a living for a man anywhere. I want to say further that one pound of brain on the farm is worth a ton of muscle.

I was very much interested in the talks which preceded me this evening. One of them suggested to me a farm home with which I have the honor to be well acquainted. It was at one time my duty to judge the butter at a State Fair in Washington, and in awarding the prizes I was required to give my reasons for giving them. I did not know whose butter it was that had won first prize, but it was one of the finest samples that had ever come to the association. In my talk I told them this, and said that I could tell some things about the man who made that butter, although I did not know who he was. He happened to be sitting on a seat right in front of me, and it was the first time he had attended one of our meetings. When I got through, he rose up and asked some questions. I saw immediately that I had a man of brains to deal with, and I answered him as intelligently as I could. I saw that he knew something. I had spoken particularly about the excellent flavor of the butter, and made the remark that the man who fed the cows understood the science of feeding to get butter of that flavor in the late winter. He said that his principal feed at the time was turnips, and that they were old and strong. Then I knew that I was dealing with an exceedingly intelligent man. I said, "I can tell you just how you feed turnips," and I told him. "Yes," he said, "that is exactly the way I do it." I said, "Where did you learn?" He said, "From experience, and I read it in the papers." I afterwards cultivated his acquaintance. He had been educated for a lawyer, but had given it up because he had been very successful in some commercial ventures, and had cash in the bank and partly owned a mercantile establishment. He became so prosperous that he thought he had enough money ahead to develop a supposed iron mine, and lost everything he had in it. He went into the woods, and took up eighty acres of land, and cleared off a little place large enough to build a house and barn, and when he got them built he was three thousand dollars in debt. He was a man of integrity, well known in the community, and could get credit. In nine years he had paid that debt, had built a nice, modern dwelling, had built a large, commodious barn, and had cleared off 40 acres of the land. Twenty acres was natural prairie, and was kept in pasture, but some 45 acres he had put under the plow. During that time he never hired a day's labor, but he, with his three boys and three girls (the oldest boy being sixteen at the time he went on the farm) has done the work of the place and built the houses. They never went to work before seven o'clock, and no one ever did any work after six o'clock, but the evening was reserved for reading and amusement. The oldest boy in that family came to school with me later, and graduated in agriculture, and was offered a valuable position in Washington, but refused it to go back to the farm, because he had not been educated away from the farm, and farm life to him had not meant drudgery. That home is a model home to-day, and one of which the State of Washington is proud. There is a case where hard work, combined with brains, has made a home. He now has forty head of fine Jersey cows, and an income of $3,600 a year from that little farm.

The average yield of hay on farms in the United States is 1.1 tons per acre. On some of our best conducted farms, it is not far from 7 tons. This difference is not wholly due to the differences in soil and climate, for it is not infrequently found on adjacent farms. In such cases it is due to differences in methods of management of the soil. Similar differences are found in the products of herds of cattle on adjacent farms. We may say that it is simply a matter of difference between men; and this is very true. Our problem then is with the farmer himself. It is a mistake, however, to suppose that these differences between men are necessary; they frequently represent differences in opportunities ; and when this is the case, it is possible to lift a man out of the average class and place him amongst those in the forefront of his calling. Herein is the justification for much of the money expended in recent years in agricultural investigations and in bringing before the farmer the results of these investigations by means of schools of agriculture and other means of disseminating information.

The subject before us is so broad and complex that I shall be confined, in a brief discussion of this character, to very general remarks. The farmer must not only be a business man, knowing how to buy and sell to advantage, how to prevent waste, and how to arrange the details of a complex business, but he must understand something of the principles of chemistry, botany, mechanics, and animal and plant physiology. To do this he must not only possess executive ability, but he must be a student. The most frequent mistake the farmer makes is to think too little and work too much. Even on a small farm, it pays better in every way for the responsible head to spend a portion of his time studying the literature on his subject, and in laying out plans for the work, even if extra help must be hired to take his place in the field. Sooner or later the direction of the work on American farms will devolve on those whose time is worth more when they are employed thinking than it is when they are doing manual labor. He who plans the work of a farm must not work so hard that he has no energy left to do the planning; if he does he will sometime find himself working under someone who does take time to plan.

To run a farm properly, no matter how small it may be, someone must decide many important questions every year. One of the most vital of these is what crops to grow. In order to show how complex such an apparently simple question may be, let us consider for a moment the number of things that must be taken into consideration in answering it. First, there are the climatic conditions. The relation of most crops to climate is fairly well understood, so that this phase of the question is usually of minor importance. It is of much importance, however, in the case of any new crop. Quite recently our farmers across the line have been greatly concerned about the climatic relations of alfalfa. Many have refrained from sowing this most valuable of all hay crops under a mistaken notion that it was not adapted to humid or to fairly cold climates. The amount of labor involved in handling a crop must also be considered in deciding what crops to grow. Farm labor is growing scarcer and less satisfactory every year in our country, and there is a strong tendency to adopt styles of farming that require a minimum of labor. Most American farmers are tilling too much land, and the crops grown must be governed to no small extent by the amount of available working capital. Then the system of cropping must be such that the crops dovetail together, so that no land shall lie idle between crops. The crops must also be chosen so as to distribute the work during the year. Otherwise, the farmer must depend largely on temporary labor, which is always unsatisfactory and high priced.

Then there is the question of the adaptability of the soil to the crop, which requires considerable special knowledge. Few farms are uniform in all parts, as regards the character of the soil. One part is better adapted to oats, another to potatoes. Shall the farmer follow his rotation blindly, or shall he increase the acreage of this crop this year when it hits on the field best adapted to it, and decrease its acreage next year, when its turn comes on another field not so well suited to it. Again, the prevalence of cetain insect pests or fungous diseases may have an important bearing on the choice of crops. Finally, there is the question of markets to consider. In our Southern States farmers are greatly handicapped because cotton is the only crop they can grow for which there is a market ready at hand.

I have discussed this subject somewhat in detail to show how complex may be the simple question, "What crops shall I grow?" Yet this is only one of many questions just as complex that must be answered every year on every farm. For instance: what stock, if any, shall be kept on the farm? Shall it be horses or cattle, or sheep or swine, or two or more of these? If cattle, then shall we go in for dairying or beef production, or both? In either case, what breed shall we choose, and how many head shall we attempt to keep? What feed shall we raise, and how many acres of each kind? If we decide on dairying, shall it be butter or cheese or milk?

Take a simpler case. Here is a crop of oats to be grown. "What variety is best?" "How shall the soil be prepared?" "What crop shall it follow?" "What manure is it best to use, and how much?" "When shall the seed be sown?" At what rate per acre? And so on ad infinitum. Is it any wonder that many of these questions are answered wrongly, even on the best of farms?

The continued answering of a host of questions similar to those above constitutes Farm Management. No business calls for wider knowledge or better judgment than this. We cannot take all these questions into the laboratory and answer them with test tube and scale. They must be worked out on the farm in actual practice. The whole subject is so complex that its main features must be largely guesswork, tempered by good judgment, and based on the results of successful practice.

There are those, doubtless, who would maintain that the student of agriculture has done his duty by the farmer when he has unveiled the principles the farmer must apply in his work. Yet the problem the farmer has, of applying these principles in practice, is often greater than that of discovering them. Can we not help him in this difficult undertaking, or shall we leave him to his own resources? Since the proper planning of the work of the farm is the most important element in the final results, it seems to me that we can advance this great and fundamental industry in no other way so certainly and so rapidly as by giving the farmer all possible aid in this direction. Much has already been done in this line. The better class of agricultural papers have taken up the subject, and, by publishing accounts of the methods used by successful men, have furnished suggestions to others, which have resulted in much improvement in methods of farming generally over the country. But in publishing such accounts the newspaper naturally selects those points which will make an interesting story, and omits many details which are necessary to a clear understanding of the methods described. I am of the opinion that it is desirable to furnish farmers with full and accurate statements of the methods used on the most successful farms of all types. This might not make the best reading matter for a newspaper, but it would furnish good material for study on the part of the farmer, and is, therefore, suitable for publication in the form of bulletins.

I have already pointed out the difference in the results obtained by the average farmer and the best farmers. The best farmers are those who are able, unaided, to adapt themselves to the conditions surrounding them, and to work out in a practical way the problem of applying the teachings of science to their work. The average man is waiting to be shown, and, unfortunately, he can be shown. The different classes of farmers are very well described by Elbert Hubbard, who, in speaking of initiative, says: "It is doing the right thing without being told. But, next to doing the thing without being told, is to do it when you are told once. . . Next, there are those who never do a thing till they are told twice. . . Then, still lower down in the scale than this, we have the fellow who will not do the right thing even when someone goes along to show him how and stays to see that he does it." There are some farmers who learn the secret of success without being told. Others succeed when they are told how to do it; unfortunately, there are others who would not succeed with any amount of help.

Acting on the assumption that there are many farmers whom we can materially assist by furnishing them the best accounts we can secure of the methods of our most successful farmers, we are now engaged in a search for men who have been pre-eminently successful in the various types of farming, in order that we may describe their methods in some detail in the publications of the Department of Agriculture. Occasionally we find a man who knows more than he cares to tell, and this is not surprising. I met a market gardener the other day who is getting rich growing a crop his neighbors have been unable to grow. He would not tell me all I wanted to know, nor could I blame him for it. Usually, however, such men are sufficiently philanthropic to give others the benefit of their experience, even if they lose some advantage thereby. In all the cases that have yet come under my observation, these pre-eminently successful men are students. Not only are they familiar with the teachings of agricultural science, but they have worked out practical methods of utilizing scientific principles in their farming operations. I may overestimate the value of this work; but it seems to me that it is a very promising means of raising the standard of farm practice.

The most frequent mistake the farmer makes is to think too little and work too hard. I know an old farmer in Missouri who made a great success; but he made most of his money lying awake at night thinking. It is thinking that pays on the farm. Study the literature of the subject, and lay out plans of the work, even if you have to pay for help in the field. The point I want to make is this: I have conceived the idea that the student of agriculture may help the farmer in planning his farm work—help him to introduce into practice on the farm the principles discovered by the scientist. Just how to go about that is a little difficult. But let me tell you of one method we are introducing. In travelling over this country and in the United States, I find here and there a man like the one I spoke of a little while ago—a man who has been pre-eminently successful in some particular line. When I discover such a man, I camp with him until I have made a complete statement of everything that man does. I afterwards publish this information in bulletin form, in order that less successful men may have him to follow as an example. If I were to write a bulletin and tell the farmers how they ought to do, they would make fun of me. They would say: "You go and try it; it cannot be done." So I go about it in a different way; I show what another man has done, and say, "You go and do likewise."

I am now going to tell you of a man who has done the impossible. I hesitate to tell half the truth regarding this man ; but a better man than I had already published these things over his own signature. I refer to L. H. Bailey's leading article in the November number of "Country Life in America." In hunting for successful men I ran across a minister in Philadelphia, Rev. J. D. Dietrich, who, in 1881, inherited a little thirteen-acre farm, with one horse and two cows. The farm was in the suburbs of the city, and had been run down by two hundred years of unscientific farming, and at the time he assumed charge, it did not support the one horse and two cows. Mr. Dietrich had never had a day's experience on the farm in his life. He went to reading, and the first book he got hold of was Young's little book on "The Soil and Cattle." He got an idea from that book, which was that, on a thirteen-acre farm, where land is worth $1,500 an acre, he could not afford to grow pasture, so he put his cows in the barn and commenced growing feed, and cutting that feed and carrying it to the cows. He lost four hundred dollars as the result of his first year's operations. During the next six years he paid off a mortgage of $7,200 which was on the property, and the next year he spent in Europe. He is to-day a director in three large corporations, and one of the best known men in the United States. He has a continual stream of visitors flocking to see that little farm, so much so that he is thinking of charging admission to protect himself. He now keeps thirty head of stock on that farm, and last year sold thirty-three hundred pounds of hay. He does not raise grain, but raises hay, silage and soiling crops, and buys gluten meal, linseed oil meal, and bran. He also raises a little corn, but buys no commercial fertilizers. If you will calculate how much dry matter it will take to supply thirty head of stock, you will get an idea of what the farm produces, and it was the best-kept herd I ever saw in my life. If you make the calculation, you will find that it will take seven tons of hay to every acre of land on that farm every year. He keeps no record, so that I could not find out what his yields were, but he told me how much milk he sold, and he has cleared $2,000 a year selling milk and young cattle. He gets $100 each for his calves, and is one of the most intelligent breeders in the United States. He does very little work himself, but one thing about the place is absolutely remarkable, and that is the system and orderliness. He said, "I can leave home at any time, without notice to my hired hands, and be gone a week, as I frequently am on Farmers' Institute work, and when I come back home, just as soon as I see either one of my hired men I know what time of day it is, because I know what they are both doing every hour of the day." He had twelve fields on that thirteen-acre farm, but he sat there and told me the crops that had been grown on every one of them for three years past; he knew the farm like a book. There is an example of system in management. I have written up all I could learn about that farm. Before I left home I handed it over for publication, and it will be published in the year book of the Department of Agriculture during the winter. I contend that it is worth a great deal to the average farmer to have a description of the work of the most successful farmers; and that is the work we are doing in encouraging the study of system in farm management.

SOME OF THE ASPECTS OF NATURE STUDY.

By Dr. W. H. Muldrew, Dean, Macdonald Institute, Guelph.

I must thank the preceding speakers, one and all, for their assistance to me in introducing this important topic. The addressses of the day have urged over and over again, and from many points of view, the necessity for an education in harmony with the lives of the people. This principle forms the basis for Nature Study in its relation to agriculture, and it remains for me merely to sum up these excellent arguments in a few closing words.

School systems are receiving much criticism just now, and ours, in spite of many excellent features, is not excepted. We are told, for instance, that the public schools are out of touch with the people, that the higher schools widen the breach, and that the universities turn out impractical men. If such charges are true, even in part, it is time for us to examine the causes of such conditions and to seek a remedy.

We are all well acquainted with the theory of a pyramid based on our public schools and promising a liberal education to every one who will but climb. If such a "liberal" education is fitted to make men truly free by giving them the mastery over the conditions in which they live, then surely this is a high and worthy ideal. But this word "liberal" has not always stood for breadth and depth in education, and even now it suggests too often rather that narrow conception of liberty which we have inherited from the ancient world. Greece and Rome have given to us many good gifts, but their distinction between the free man educated for a life of ease and the slave destined to hopeless toil should have no place in the civilization of the twentieth century. The liberal education of the future will make men free indeed, because it will provide knowledge and power in active relation to the conditions under which they must live.

A few years ago the President of our Provincial University, standing at the apex of our educational system, in the course of a public address, deplored the fact that our students could not secure a liberal education in this Province before the age of twenty-one or twenty-two years, because they were not taught Latin, French, German, and perhaps Greek in our public schools. He was looking to Germany for a better system, and found that there, these subjects were begun at ten years of age. We must take issue with the learned President as to this conception of a liberal education, and we shall find very strong support for our position in the words of the German Emperor, spoken not long after the time to which I refer. Kaiser Wilhelm must have a fair acquaintance with the conditions in Germany, and certainly combines with some eccentricities a great deal of good judgment, but he declared most emphatically that he was dissatisfied with the results of such education. "We do not want," said he, "to make our boys into young Greeks or young Romans; we want young Germans, who are in touch with the real life of their own country." And the education that is making Germany is not obtained in these "liberal" schools, but in the "real" schools which are supported there as perhaps nowhere else in the modern world.

People are asking, more and more, if education is to be a preparation for life, why must the schools be kept apart from the life for which they prepare? They ask, is it necessary to go back thousands of years in time and away thousands of miles in space to find materials for cultivating the minds of our children? Education is not the only thing that has suffered from the same error. There have been systems of religion out of all relation with human life. Such can never stand. The only religion that can bear the test of ages will build up men's characters by actual contact with actual life and experience, and so it must be in education.

Nature Study, Manual Training, Industrial Training, and Domestic Science as subjects of school study are but branches of one fundamental principle or method which would aim, by basing education on the commonplace experiences of actual conditions, to prepare for living here and now. Having thus learned to live, it will be the place of literature and abstract learning to teach men to live better.

The boy who conducts a careful experiment in the growth of crops and follows out the causes of its success or failure gains as much mental training as if he had written a poem in Latin, but, in addition, he comes into contact in a most vital way with facts and principles that will be of use to him as long as he lives. These branches are often spoken of as if they were new. They are nothing of the kind. They form the essentials of the oldest things we have in education. Wherever a mother with sympathy and kindness has encouraged the questioning spirit of her child in the midst of this strange world; wherever an intelligent father has helped a little one groping in the dark to a better understanding of the things around him, there you have Nature Study, in a form that may be imitated, but can never be surpassed, in the work of a school.

The part of the schools must be to make such training a little wider and a little more definite, and thus to lead onward to a knowledge of nature, a sympathy with nature, and a power in the guidance of nature into harmony with human life. But before this can be done in our schools I am satisfied that our teachers must be trained and guided and interested. There is a theory that every teacher is qualified to teach along the line I have indicated. I wish that such were true, but it is not. I have great respect for our public school teachers who labor under many and great disadvantages, but I know something of their limitations as well. They need training, both in knowledge of nature and in methods of teaching, but beyond this they need interest and enthusiasm. At present I fear that not much is being done in our schools in this section, but we hope that more will be done in the future, and one of the aims of the Macdonald Institute will be the preparation of teachers who can carry to the schools some of the knowledge and enthusiasm that are necessary for dealing with this subject.

But a great deal has been done outside the schools. If you were to ask me for a practical example of what Nature Study is and what can be accomplished through its methods, I would not take you to any of our universities, or even to the professors of our own College here, though some of these have done much for our subject. I would not go to men who write books or deliver addresses on Nature Study. But I would take you to a modest gentleman, whom you all know as Mr. Zavitz, and who has, I believe, done more to pave the way for practical Nature Study than any other man in Ontario. I should like some fine summer's day to take you to see him in his office, directing his 3,000 or more Nature students all over this Province, who are following carefully his directions, asking questions of nature, accurately recording the answers and reporting them to their headmaster here. I am sure that nothing has been done and that nothing will be done for some years to equal this work in spreading methods of ideal Nature Study. If we could provide for our schools men and women with a little of the enthusiasm and knowledge and system of Mr. Zavitz, the problems of Nature Study would soon be solved. Could the Macdonald Institute turn out every year one teacher capable of directing even in a school section such work as is being done by the Experimental Union, people would very soon begin to see the meaning and the value and the need of such work.

As time goes on we shall hope to see more and more clearly just what can be done, and when the members of this Union come back from year to year to spend with us a few days in happy re-union, I trust that they may find us making some progress towards our ideal. If we are not thus progressing I trust that they will deal with us as they are wont to deal with their unprofitable servants.

PROGRESS OF THE ONTARIO AGRICULTURAL COLLEGE.

By Prof. G. E. Day, Agricultural College, Guelph.

It is rather a difficult matter to deal with the progress of an institution without going more or less into statistics, and they are extremely dry matter, and something I am very loath to inflict upon you; therefore I shall try to avoid them as far as possible. What I have to say will not deal with ancient history, but with the more recent developments of the institution, which may be of interest to those who have not been in attendance for the last three or four years. In regard to buildings, those who have been away for a few years and have returned will no doubt be struck with the considerable development in this connection. In the main building very marked changes have taken place. The old library and museum, and the live stock class room exist no longer. In their place you will find students' rooms, so that there has been provided much greater accommodation for students. The new library building is a recent addition, and we believe there are few finer in the Province. For it, we are indebted to the Massey Estate. Below that there is another large red brick building, devoted to biology and agricultural physics, and containing also a museum. The removal of the biological department into that building relieved the horticultural building, and left more accommodation for the horticultural department. In place of the old live stock class room, we now have a live stock judging pavilion, which is far more convenient for live stock lectures. There is also an enlargement of the poultry building, fitted up with class rooms for demonstrations, etc. Lastly, there is the new Macdonald Institute, of which you see only the beginning as yet.

Just a word as to the course of instruction. Some fifteen years ago it was thought advisable to put on a three-year course, and prepare students for a degree. It was done with a great deal of misgiving at that time, for fear, I presume, that no students would enter, but we soon had to increase it to a four-year course, and still find the number of students in attendance growing larger. We are now going a step further, and insist on the necessity of university matriculation before the student goes on for a degree. For the benefit of those who have not matriculated and are anxious to come back for extra work after putting in two years, we have inaugurated a three-year course, which takes up very similar work in agriculture and many other branches to the four-year course. And to everyone who completes that course and passes a successful examination, we give a certificate. In addition to this, we have the old-time two-year diploma course, and we have also special short courses. In the short courses, there is one in dairying, which is well patronized. Then, a year ago, we started a short course of two weeks in stock judging. Most of the time is spent in practical work in the judging of live stock, and a part of each day in the discussion of subjects relating to the feeding and management of live stock. This course is proving very popular, and we had over two hundred students in attendance last year. This course was the means of getting for us the new pavilion, which we use for regular classes. About the same time there was started a short course in poultry raising, which includes judging of poultry, and the principles and practice of poultry-breeding, feeding, etc. This is a four weeks' course. We do not expect quite so large an attendance in that course as in the others, though the attendance has been remarkably good, and has fully taxed our accommodation. But I expect our new courses will all be put in the shade by the courses given at the Macdonald Institute. Hitherto, our efforts have been devoted to the education of young men; now, the institution has started out on a new tack, and is prepared to give instruction of the most valuable kind to young women. The course includes domestic economy, nature study, etc.

Those who have come back to visit the College after a lapse of several years will notice that many changes have taken place in the staff. This is caused, not so much by the fact that members of the staff have been dropping out, although a few of them have, but it is due more to the fact that the staff has been increased. In some departments, where formerly there was only one instructor you will find two, three, and sometimes more, including fellows, demonstrators, instructors, etc. Then, of course, we have a very strong addition to the staff in the members of the staff of the new Macdonald Institute.

As regards the students in attendance: I have already intimated that we have enlarged accommodation for students in the main building, but we have not yet gone far enough. When the accommodation was increased, we thought we had fully provided for the demand, but we find that we have not nearly enough room, and already require more dormitory accommodation. We have this year the largest classes in the history of the institution. There are some two hundred and fifty students in attendance in the regular course at the present time.

This, no doubt, is all very satisfactory. We have increased the number of instructors, we have increased our accommodation, and we have increased our attendance; but, after all, are we progressing along the line of bringing our work into touch with the farmers of the Province, because that is the crucial test of the value of this institution. Some years ago, very few farmers could be found who were in sympathy with the College; it was harder to find one then who was in sympathy with the institution than it is to find one to-day who is not in sympathy with it. We think this is a favorable indication. It is due to a number of causes. One of the first things to bring the College into touch with the farmers was the Farmers' Institute system. The Farmers' Institutes accomplished it in two ways; first, it brought the instructor from the College into contact with the farmer, and he was frequently able to help the farmer with information; but, more than that, it brought the instructor into touch with the farmer. and he learned the conditions under which the farmer had to work, so that he returned to the College with more intelligent ideas of the nature of the investigations he should follow, and of the instruction he should give in order to make his work a success. I believe that right there was the turning point in bringing the institution into sympathy with the agricultural community.

I believe also that the Farmers' Institute excursions that have visited our institution have been a very important factor in interesting the farmers in the College, and if I may be allowed to say it, I believe the character of our work has had something to do with it, that is to say, as people became more familiar with what we were attempting to do, they gradually began to realize that we had a very important work to perform, and instead of indulging in captious criticism, they began to devote their energies towards criticising us, with the object of enabling us to improve our work. I believe that criticism rightly directed is a good thing. We are far from perfect in many respects yet; there is room for a great deal of development in many lines, but, at the same time, I believe that a great deal of progress has been made, and still further progress will be made in the future. One of the chief aims of the institution to-day is to get hold of the young man from the farm and make him a more intelligent, thinking, human being, a man among men, who need play second fiddle to none, no matter what the calling of the other man may be. Whether we are accomplishing this or not, I must leave to the ex-students to say, but I believe as time goes on and our machinery becomes still more perfect, we shall be able to accomplish still more in that direction.

Dr. James Mills: The American institutions have seen the importance of dividing the Department of Agriculture into two distinct branches in order that the work may be more specialized. One is called the Department of Agronomy, and embraces all that relates to the growth of plants, including the proper cultivation of the soil, and the second is the Department of Animal Husbandry, embracing the breeding and treatment of live stock of all descriptions. I believe that we must specialize in our study of the conditions that govern successful agriculture, especially in a new country like ours. We must not ask our Professors to undertake too many things. I am glad to say that we have very strong backing in our work in the Minister of Agriculture, and as head of the College I feel that anything we may have been able to do is largely through his sympathy and assistance in securing for us the necessary funds. A good College is an expensive institution. You cannot have a successful and growing institution such as this without spending a good deal of money. You may spend the money without accomplishing anything, it is true, but you certainly cannot expect to accomplish anything without ample means. Even though you may secure the best men to take charge of the various branches of the work, you cannot hope to keep them without a fair amount of remuneration.

Colonel Ferguson, Pictston Hill, Scotland, on being called upon for a few remarks, spoke with great appreciation of the work of the Agricultural College, and of the benefit of such an institution to the agriculture of the country, declaring that he had never seen experiments so well conducted and systematically carried out as those undertaken by the Union.

PROPOSED MEMORIAL TO THE LATE PROFESSOR PANTON.

W. J. Brown, representing the committee appointed at the last meeting of the Union to consider what arrangements could be made with regard to a memorial to the late Professor Panton, reported as follows:

"The committee believes it necessary that we should keep fresh in our memories some of the leading features of Prof. Panton's life, in order that the undertaking contemplated may be carried out in the spirit in which it was first suggested. Prof. Panton served the College and the country faithfully, and in the most unselfish spirit, for many years; he performed an important duty in developing the technical and scientific side of the College work during the most trying years in its history, when it was struggling for recognition; his efforts to systematize and apply the principles of pure science to agricultural practice have proven of the utmost importance to the farming interests of this country. He was always hopeful and thoroughly zealous in making scientific study popular. He was a pioneer in Nature Study, as now understood and appreciated; he was a gentleman of splendid type, a scholar of ripe experience, and a Christian who lived and worked with singleness of purpose; he was beloved by his students, whose lives he touched in many cases at their most vital points. The importance of this influence during the pivotal and character-forming years in the lives of hundreds of young men cannot be over-estimated; he not only did his duty, but he took every opportunity to broaden, enrich and stimulate those who came within his influence.

"It is characteristic of College students to experience the tenderest feelings for their Alma Mater, and to admire the men who sympathetically and patiently guided their feeble footsteps into the paths of knowledge, and made it possible for them to appreciate, perhaps for the first time, the joys and struggles of the intellectual life. It is only natural that our whole ex-student body should have the kindliest feelings for one who worked so long, so faithfully and so well. It has been stated with much truth that Prof. Panton's work was his best monument and most lasting memorial ; but is it just to his memory or fair to the institution which he served to let matters rest there? It would not be appropriate to suggest anything elaborate or undignified; but we should nevertheless keep the image of the living man and the splendid record of his noble life work constantly before each succeeding generation of students. In this young nation we are not doing our duty by those who toiled to make present conditions possible. We are not utilizing our opportunities to spur our perplexed youth by emulating the lives of those now gone who were the embodiment of character and power.

"Again: This is the first time in the history of our College that a Professor whose connection with the institution has been almost continuous from its inception, has died in its service. This is the first opportunity the hundreds of ex-students have had to express their feelings in a tangible form. In all our older educational institutions the alumni have time and again responded to similar requests, with the result that the halls of their colleges are graced with dignity, and are rich in historic character.

"Your committee believes that the most appropriate form for the memorial to take would be a portrait in oil, painted by some artist of repute, and placed in one of the College buildings, and recommends that the money be raised by a personal appeal to the ex-students, officers and ex-officers of the College."

Mr. T. G. Raynor moved, seconded by Professor Hutt, that Mr. W. J. Brown, Dr. James Mills, and Mr. Nelson Monteith be a committee, with power to add to their numbers, to take up the matter in accordance with the recommendation of the previous committee. The resolution was carried unanimously.

THIRTY-FIFTH ANNUAL REPORT

OF THE

FRUIT GROWERS' ASSOCIATION OF ONTARIO

1903

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE.)

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Fruit Growers' Association of Ontario.

OFFICERS FOR 1904

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Vice-President	Alex. McNeill, Walkerville.
Secretary-Treasurer	P. W. Hodgetts, Parliament Buildings, Toronto.

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"	2	R. B. Whyte, Ottawa.
"	3	Harold Jones, Maitland.
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"	11	T. H. Race, Mitchell.
"	12	J. L. Hilborn, Leamington.
"	13	G. C. Caston, Craighurst.

Ontario Agricultural College: Prof. H. L. Hutt.

Honorary Directors: Thos. Beall, Lindsay; A. M. Smith, St. Catharines; W. T. Macoun, C.E.F., Ottawa; W. A. MacKinnon, Ottawa.

Editor Canadian Horticulturist: L. Woolverton, Grimsby.

Auditor: J. M. Duff, Guelph.

REPRESENTATIVES TO FAIR BOARDS.

London: T. H. Race, Mitchell; J. S. Scarff, Woodstock.

Ottawa: R. B. Whyte, Ottawa; Harold Jones, Maitland.

Toronto: W. E. Wellington, Toronto; G. C. Creelman, Toronto.

COMMITTEES.

Executive: President, Vice-President and Secretary.

Board of Control Fruit Experiment Stations: Elected by the Association: A. M. Smith, Elmer Lick, W. T. Macoun; (ex-officio): G. C. Creelman, Chairman; Prof. H. L. Hutt, P. W. Hodgetts.

New Fruits: Prof. H. L. Hutt, W. T. Macoun, L. Woolverton.

Transportation: W. H. Bunting, R. J. Graham, H. W. Dawson, D. D. Wilson, W. L. Smith, D. J. MacKinnon, J. M. Shuttleworth.

Fruit Growers' Association of Ontario

ANNUAL MEETING.

The annual meeting was held in the Town Hall, Leamington, on Tuesday afternoon, November 24. The chair was taken by the President, Mr. W. H. Bunting, at 2.30 p.m. o'clock.

REPORT OF THE EXECUTIVE.

By G. C. Creelman, Secretary, Toronto.

In presenting this, my second annual report as Secretary of the Ontario Fruit Growers' Association, I wish to thank the Directors for the support which they have given me in carrying out the details of the work of the Association. Where the members of the Board are located in so many different points of the Province, and where the fruit interests of the different localities are not the same, it is not practicable for the Board to deal with other than general questions. The detailed work of the Association has to be done by the Executive Committee, or by the Secretary dealing directly by correspondence or otherwise with the individual members of the Board.

On the whole, I feel that we can report progress, and I have divided my report into sub-heads, that you may see exactly what has been accomplished in the different departments of our work.

(1) Local Fruit Growers' Associations.

In my report last year, we made note of the fact that a number of Local Fruit Growers Associations had been organized throughout the Province, under the direction of the Executive Committee. At the time of organization, experts were sent to the different localities to give instruction on orchard management. The object of these local organizations was stated to be, "to assist the farmers to produce more and better fruit." We realize now that this was not broad enough. In many instances more fruit was produced than could be profitably handled. I think, therefore, the time is ripe, taking these local organizations as a nucleus, to organize associations for the purpose of buying and selling; buying packages, spraying materials, etc., and the selling to the best advantage all of the products of the garden and orchard. In the Georgian Bay district the idea of buying was put into practical effect last year, while this year we have the splendid example in the Lake Huron district of what might be accomplished in the way of disposing of our fruit by co-operative storing and selling. The following report from Mr. A. E. Sherrington will give you an idea of the work being done and the advantages derived from co-operation:

This Association was organized in the month of March, 1902, with a membership of twenty-four, under the auspices of the Fruit Growers' Association, and by direction of the Secretary, Mr. G. C. Creelman. The rules, as laid down by the Association as a guide for Local Associations, were adopted, and have been carried out as closely as it was possible to do so. The Association met monthly, and at these meetings the different subjects regarding fruit growing and co-operative work in connection with it were discussed. Untold good has been done along these lines, and it has caused a great deal more interest to be taken in the cultivation and care of the orchard.

A new set of rules and by-laws is now being prepared, and incorporation applied for. I should like to mention the rule governing packing. Each member must pack and grade his own fruit, placing his name on each package with either stencil or rubber stamp, and stating the variety and grade of fruit. In this way every member becomes responsible for his pack. In 1892 the Association made their first trial in the co-operative work by putting up two cars of Duchess apples made up of 1,000 boxes and 100 barrels. These were sold f.o.b., but forwarded to Manchester, England, and arrived in good condition. In addition to these, three cars of winter apples were packed and sold. This year the Association has prospered beyond all expectations. We now have between fifty and sixty members, and shall go in for co-operation in the shipping of apples. Up to the present time the Association has shipped fourteen car loads.

Advantages of Co-operation.

(1) We believe that the grower is the proper party to grade and pack his own fruit. By so doing he receives better prices, and better prices mean more money, and more money means more interest being taken in the care of the orchard and fruit.

(2) By co-operation apples were not left lying on the ground waiting for the packers to come and scramble over the piles for a few of the best speecimens, and wasting the rest, but are packed as gathered from the trees, thereby saving a larger percentage of the fruit.

(3) Another advantage in co-operation is in the handling of early apples, as all the members can commence picking and packing the same day. In this way, only two or three days will be required to make up a car, and the fruit will be got away in a fresher and better condition than by the other way of selling to the buyers.

(4) By co-operation money can be saved by purchasing packages in large quantities.

(5) There are no middlemen to pocket the larger share of the profits.

(6) By co-operation, better shipping facilities and lower rates may be obtained.

(7) By co-operation more interest is taken in the markets and more intelligence applied to the business.

(8) Co-operation not only increases the profits, but induces the members to take a deeper interest in the production of a better quality of goods, and the putting of them on the markets in a better condition. The consumer, also, in buying the goods will have a more friendly feeling for, and will take more interest in the producer, as a closer relationship will be established.

(9) As to the possibilities of co-operation, it is impossible to tell what the outcome will be, but in my opinion it is bound to grow and become a power in the country. In the case of the Lake Huron Fruit Growers' Association, the next move will be to build a store house where packages may be stored ready for use, and where they may be returned when filled and kept until the cars are made up. I have no doubt that in a short time other farm products will be added to the list of co-operative shipments, such as butter, eggs, and poultry. These products can all be handled by co-operation.

(2) Orchard Meetings.

Meetings in the orchard having proven most successful in 1902, it was decided to continue the work during the present year, and to this effect the following letter was mailed to each of the local organizations, and to such other points in the different parts of Ontario as recommended by individual members of the board :

"Toronto. Feb. 23, 1903.

"Dear Sir.--Following the practice of last year, the Ontario Fruit Growers' Association has decided to hold a series of orchard meetings to demonstrate the pruning and management of orchard trees. Through the kindness of the Dominion Department of Agriculture, we have been able to secure the services of some of the Fruit Inspectors, including Messrs. McNeill. Carey and Lick. These gentlemen will be available from the 9th till the 27th of March, and are prepared to give a practical demonstration in pruning, together with a talk leading to a general discussion on orchard cultivation and management, and matters generally pertaining to the fruit business.

"The idea is to assemble at a meeting-place at 1.30 p.m. for an hour's discussion on fruit matters. An adjournment will then be made to the orchard selected for the demonstration. In the evening another meeting will be held for the purpose of organizing a local Fruit Growers' Association, or where already organized, to continue the good work.

"Please let me know at once whether you desire any of these meetings, and at what places you wish to hold the demonstrations. The circuits will have to be arranged befor the close of next week, so that it will be necessary for you to reply promptly to secure the services of these gentlemen."

After having heard from the different points where it was thought advisable to have meetings, we took the matter up with the Farmers' Institutes in each district, and secured their co-operation, good-will and financial support to the benefit of all concerned. The folowing is a copy of the letter mailed to the Institute Secretaries at that time :

"Toronto, March 9, 1903.

"Dear Sir,—I am pleased to announce to you that we have arranged to hold Fruit Institute Meetings in your district this spring. The Ontario Fruit Growers' Association, at its last meeting, decided to again co-operate with the Farmers' Institutes, and, as far as possible, hold meetings to assist the local fruit growers in their work. The meetings in your district will be held at ...., and the speakers will be ....

"I shall expect you to advertise the meetings, arrange for halls, and pay for the same out of the Farmers' Institute funds, as it will be largely your members who will receive the benefit at this time. The speakers will not cost you anything. I will write a personal letter to each of your members in your district, naming the place of meeting and the date, and I would like you to bill the district as far as possible, so as to secure a good meeting. The idea is to call the meeting as usual at 1.30, and at 3.30 to adjourn to a local orchard for a practical demonstration in pruning, grafting, etc. In the evening a general meeting will be held for discussion and organization. You will please arrange with some one near the hall for the use of his orchard.

"I would like you to look after this matter personally, but if you find you cannot do so, please appoint one of your directors, or a member who is particularly interested in fruit, to act for you."

While we realize that the officers of the Local Fruit Growers' Associations, and the officers of the Farmers' Institutes must be held largely responsible for the meetings, I have found that a personal letter to the farmers themselves will often bring them to the meetings, where they would pay no attention to an invitation from a local man. To this end the following personal letter was sent to every farmer whose name could be secured in the neighborhood :

"Toronto, March 13, 1903.

"Dear Sir,—At the last Annual Meeting of the Ontario Fruit Growers' Association the Secretary was requested to arrange a series of Orchard Institute meetings, particularly through the apple districts of the Province of Ontario. Since the beginning of the year the Secretary has been corresponding with fruit growers throughout the Province in reference to the best places to hold these meetings, and has finally arranged the following schedule. It is intended, as far as possible, to hold a short meeting in the hall in the afternoon at 1.30, and at 3.30 the meeting will adjourn to a neighboring orchard, where a practical demonstration will be given in pruning, grafting ,etc., as well as a talk on orchard cultivation and methods generally pertaining to fruit growing.

"It is expected that the members of the Farmers' Institutes and Horticultural Societies, as well as every farmer interested in the production of fruit, will be present and receive instruction and take part in the discussion.

"In the evening a general meeting will be held for the purpose of organizing a local Fruit Growers' Association. The object of these associations shall be to foster the fruit industry. Such organizations already formed have done good work in discussing methods of cultivation, and picking, packing, grading and handling of fruit, co-operative shipping, co-operative buying of packages, etc."

An Illustration.

To give you an idea of what takes place at these meetings, I take the liberty of quoting here from the report of Mr. G. C. Caston, some of the questions asked and the answers given at the orchard meetings attended by him :

Q. What is the main object to be aimed at in pruning ?

A. First, symmetry of the tree, and if the orchard is to be cultivated, which it certainly should be, remove all branches that are inclined to droop, and keep trees well headed up ; second, to keep the top open enough to allow of a free circulation of air and sunshine through the branches ; third, an even distribution of the bearing wood (fruit spurs) all over the tree.

Q. What are the common errors in pruning ?

A. Allowing the tree to grow for years without any training at all, and then slashing and butchering it unmercifully. To open it up, they cut several large limbs out of the head, leaving the top of the tree shaped like a vase, and the hot sun in mid summer blisters the bark on the exposed branches. Then the remaining limbs are stripped of everything except a wisp on the end, only about the last two years' wood. The fruit spurs are nearly all gone, and the result is a big crop of suckers, and the usefulness of the tree is to a great extent destroyed.

Some trees of a spreading open habit of growth require very little pruning, while others, as for instance the Spy and Russet, require considerable, but it should be a thinning out of the small branches, rather than a cutting and a slashing of the large limbs.

No man should attempt to prune without a stepladder, and most of the work should be done from the ladder in thinning out the small branches around the outside. A man should never attempt to prune a fruit tree who does not know a fruit bud from a leaf bud, and who does not recognize the fruit spurs, for in pruning the fruit, spurs should be left evenly distributed over the tree. In some varieties that have the habit of setting more fruit than the tree can properly mature, a judicious thinning out of the fruit spurs is required. Then the tree will bear fruit of a marketable quality, where otherwise it would be too small. In other trees that are shy bearers, the average pruner cuts them away where they should be encouraged and developed. And here is where the pruner should understand his business. Many people's idea of pruning is simply to cut limbs out of a tree until it looks to be pretty well thinned out. They seem to have no method in their work and they do not work intelligently.

Q. Do you cut close?

A. Yes, cut close and smooth and never leave any stubs, and if obliged to cut any limbs over an inch in diameter, paint the wound well as soon as it gets dry.

Q. When is the best time to prune fruit trees?

A. The month of June is the best time.

Q. Why is that the best time?

A. Because wood growth is going on then. The formation of new wood tissue is most active then, and the wound immediately begins to heal around the edges. If the wound is made in the fall or winter, or too early in the spring, the delicate cambium around the edge is weather-beaten and injured, and does not heal so readily as if cut in the growing season.

Q. But, if you cannot do it in June? It is a most difficult matter for most people to attend to it at that time, owing to the press of work.

A. Well, the next best thing is to do it as near that time as possible. Under no circumstances should it be done in the fall or winter. This is decidedly bad practice.

Q. What effect has pruning upon bearing?

A. Where trees are making rapid wood growth anything that will check the growth has a tendency to the production of fruit buds. A moderate pruning will often have this effect. But if it is overdone you will get a crop of suckers instead. The proper course is to prune regularly and keep the tree in proper shape, and if there is too much wood growth where there ought to be fruit, use a fertilizer with a large percentage of potash and phosphoric acid and less nitrogen, such as hardwood ashes.

Q. Do you consider hardwood ashes a good fertilizer for the orchard?

A. Yes, decidedly. You cannot get potash and phosphoric acid as cheap in any commercial fertilizer, and it is a great mistake to allow them to be shipped out of the country to be used by fruit growers in the United States, when many of our own orchards are starving for need of them. I believe the production of first-class fruit, is, after all, a matter of fertility more than anything else, although pruning, spraying, and cultivation are all very important and must be attended to.

Q. What quantity of ashes would be a good dressing for an orchard?

A. That depends somewhat upon the character of the soil. Clay or clay loam soil is not so likely to need potash as sandy soil. If sandy or sandy loam, you are not likely to overdo it in the matter of potash. Forty bushels to the acre every second year would do, and I might add, a crop of clover plowed in between times. This would be vastly better treatment than most of our orchards receive.

Q. What are ashes worth per bushel for orchard purposes ?

A. Buy them as cheap as you can, but unleached hardwood ashes are worth 20 or 25 cents per bushel for fertilizing orchards, and that is cheaper than commercial fertilizers. Even leached ashes are worth the hauling if you can get them, for there is still a percentage of potash in them, and the phosphoric acid is not removed by leaching.

Q. When is the best time to apply them ?

A. In the fall.

Q. When should scions be cut for grafting ?

A. When the wood is dormant late in the fall, or early in the spring. They should not be cut when the wood is frozen.

Q. How should they be kept ?

A. In sawdust. There is nothing better. It keeps them cool and moist.

Q. When should grafting be done ?

A. As soon as the sap begins to circulate and the growth begins, but if the scions are cut at the right time and kept dormant you can graft successfully until the leaf is half out However, the earliest ones usually do the best.

Q. What is the proper formula for grafting wax ?

A. About five ounces of tallow, eight ounces of beeswax, and one pound of resin. Melt over a slow fire. Do not allow it to boil, but simply to melt thoroughly, stir and pour into cold water, and pull it until it is nearly white.

Q. In top-grafting, would you work the whole top over at once ?

A. No, you must not do that, you might kill the tree. You must keep up a balance. Take about one-third at a time, and work the new top on gradually. In this way you do not check the growth, or disturb the balance between top and roots too much.

Q. Do you consider top-grafting to be a good practice ?

A. Yes, most decidedly. It is the best way to grow our best commercial apples.

Q. What do you consider the best stock for grafting on ?

A. Something hardy. There are many varieties that do very well, and they are classed as Ironclads ; but I consider the Talman Sweet one of the very best for that purpose. There is nothing better that I know of.

Q. What do you consider the best varieties for the commercial orchard ?

A. Spy, Baldwin, King, Greening, Wagner, Snow, Blenheim, Pippin, and perhaps a few Ben Davis. That would be a pretty fair list. It is a great mistake to have too many varieties. Most of these varieties should be top-grafted. In fact, all except the Snow and Blenheim.

Q When is the proper time to spray ?

A. The first time on the bare trees, with copper sulphate, 2 lbs. in 40 gals. of water. Then again just before the blossoms open, with bordeaux mixture, 4 lbs. bluestone, 4 lbs. lime in 40 gals. of water. If there are tent caterpillars or any leaf-eating insects, this is the time to dose them, and add eight ounces of Paris green to the mixture if these insects are plentiful. There will be no damage to the foliage if plenty of lime is used.

Q. Should the lime be fresh ?

A. Yes, as fresh as you can get it. I always use the cyanide test, and would advise everyone else to do the same.

Q. What is the test ?

A. Get about five cents worth of ferro-cyanide of potassium and dissolve it in a half-pint of water. When the bordeaux mixture is made stir it well and drop a few drops of the cyanide solution in it If it turns purple on striking the mixture add more lime until it will give no color, and then it is safe to use and will not burn or injure the foliage. More than half the battle in spraying is gained by having a good pump. Never use anything else.

Meetings were held as follows:

Division 1. Delegates: A. E. Sherrington, Walkerton; P. J. Carey, Fruit Division, Ottawa.

Chesley	March 23	Mildmay	March 30	Clinton	April 6
Tara	" 24	Teeswater	" 31	Goderich	" 7
Port Elgin	" 25	Kincardine	April 1	Hensall	" 8
Tiverton	" 26	Lucknow	" 2	Exeter	" 9
Pinkerton	" 27	Brussels	" 3		
Walkerton	" 28	Blyth	" 4		

Division 2. Delegates: G. C. Caston, Craighurst; A. McNeill, Fruit Division, Ottawa.

Randolph	March 23	Orillia	March 28	Creemore	April 3
Midhurst	" 24	Oro Station	" 30	Collingwood	" 4
Edgar	" 25	Churchill	" 31	Clarksburg	" 6
Jarratt's Corners	" 26	Stayner	April 1	Meaford	" 7
Rugby	" 27	Creemore	" 2		

Division 3. Delegates: F. J. Barber, Georgetown, March 23-April 2; M. Pettit, Winona, April 3-4; Harold Jones, Maitland, April 7; Elmer Lick, Fruit Division, Ottawa.

Trenton	March 23-24	Bowmanville	March 30	Ancaster	April 4
Wicklow	" 25	Oshawa	" 31	Irena	
Welcome	" 26	Myrtle	April 1	Belleville	" 8
Newcastle	" 27	Pickering	" 2	Frankford	" 9
Orono	" 28	Bronte	" 3		

Division 4. Delegates: W. T. Macoun, Central Experimental Farm, Ottawa; A. McNeill, Senior Fruit Inspector; S. S. Cheetham, Dairy Instructor, Ottawa.

Vernon	July 7	Fallowfield	July 8	Metcalfe	July 9

Division 5. Delegates: A. Harkness, Irena; A. McNeill, Senior Fruit Inspector, Ottawa.

Morrisburg	April 23	Lancaster	April 24	Iroquois	April 7

As you see, this Association is largely indebted to the Fruit Division of the Dominion Department of Agriculture for speakers and demonstrators. I believe, candidly, that if the Ontario Fruit Growers' Association had done nothing during the year but conduct these meetings, they would not have labored in vain.

(3) The Work of the Fruit Experiment Stations.

We have been endeavoring for some years past to bring the work of the stations into touch with the farmers of the vicinity where such stations are located. We have had Farmers' Institutes hold summer meetings there with good success. So, following this up, we got the consent of the Department to send a copy of the report of the "Fruit Experiment Stations," including a description of the fruits of Ontario, to each member of each Local Fruit Growers' Association and to each farmer living in the vicinity of the stations. At the same time we mailed to each of these persons the following letter, and where names were sent in as a result of it they were also furnished with the report:

"Toronto, June 10, 1903.

"Dear Sir,—The Annual Report of the Fruit Experiment Stations, published by the Department of Agriculture, is now ready for distribution, and we desire your co-operation in helping us to place this very valuable report in the hands of the fruit growers of Ontario. As in former years, there is a continued description of the fruits of Ontario, including the Stark Apple; the Agawam, Minnewaski and Snyder Blackberries; Late Duke and California Advance Cherries; Campbell's Early and Diamond Grapes; Easter Beurre, Hoosac, Pitmaston, Seckel and Triumph Pears; Abundance, Burbank, Bradshaw, Red June and Yellow Egg Plums, and fifteen varieties of Strawberries, each variety in every case splendidly illustrated.

"The experiments also give very full notes for the past season on the varieties under cultivation at their respective stations. A very valuable addition this year is a catalogue of the values of the fruits and fruit trees of Ontario, also showing their adaptability to the various parts of the Province, designed to aid the planters in selecting suitable varieties. This catalogue, first published some years ago, has been thoroughly revised, and should prove of great value to all fruit growers.

"We would ask you to kindly fill in the enclosed blanks, with the names and the addresses of the members of your local Fruit Growers' Association, and of any other fruit men in your vicinity who would be likely to make use of this report."

As a result of this letter, we received the names of 1,047 persons, to each of whom a copy of this report was mailed. Of course, it is impossible to determine the good this educational work is doing. Farmers are reticent about their business. It is an indisputable fact that at Agricultural dinners held in our towns and villages most of the speech-making is done by lawyers, doctors, and other professional men present. The same is true in meetings of Farmers' Institutes. Very often our speakers are almost discouraged and say on returning from an institute campaign, that they do not believe they accomplished any good in certain districts. Later on, however, come letters from farmers who were present at the meetings, asking for fuller information in reference to certain things that were discussed at these meetings. We realize, therefore, that many farmers get information in orchard meetings, through our reports, and at our annual meetings, which they never acknowledge. But what matters it, so long as they put into practice the better methods ?

(4) Fruit Exhibits.

At the request of the Executive Committee of the Canadian Association of Fairs and Exhibitions, Mr. T. H. Race, of Mitchell, was invited to address the annual meeting on the subject of "Fruit Display at Our Exhibitions." Mr. Race implored the fair management to take away the barriers from in front of the fruit, and allow the people to see and examine the exhibits. He also asked that someone be present to answer questions about the fruit exhibited, and the adaptability of certain varieties to that particular district, etc. This has had a good effect, as I have noticed this year that many of our fair boards have adopted many of the suggestions brought out at that time. I am pleased to note also the general improvement in the fruit department in many of the prize lists. There is still, however, great room for improvement in this line, and I would suggest that your Executive Committee be instructed to go carefully over the model prize list prepared last year, so that accurate information may be distributed to every fair board in the Province.

Demonstrations in Apple Packing and Grading.

The following report, by Mr. A. McNeill, will show something of the work being done.

At your request I attended nine fall fairs, giving at each a demonstration in apple packing in barrels and boxes. Any want of interest that was noticeable at one or two places could be traced to want of proper advertising, or an unsuitable location, or both. Speaking generally, the interest was all that could be desired, and the arrangements fairly good. There is ample encouragement for extending the work another year.

I took the opportunity afforded me of noting the fruit exhibit generally, and would submit that the time has come for a complete revision of the prize lists and a revolution in the methods of awarding the prizes.

The prizes for fruit and the judging of it at fall fairs should be done with the following objects in view :

(1) To promote domestic trade.
(2) To promote the export trade.
(3) To encourage amateurs.
(4) To add a decorative feature to the fairs.

These objects are not of equal importance, but all should be kept in mind when framing a prize list. If classes were made to correspond to these several objects, they would undoubtedly overlap, but this would not necessarily cause any confusion, as the classes would be clearly defined. The export class would consist of a very few carefully selected varieties shown on plates, and separate prizes for boxes and barrels of the same variety, taking into consideration the packing and package as well as the fruit. The domestic class would include such varieties as are not included in the export class and yet have been found profitable. Here, again, boxes. baskets and barrels would be in evidence.

These two classes will include all varieties that are deemed worthy of cultivation for commercial purposes, and no others. It may be well, however, to have a third class for amateurs. This would include new fruit and such as is of special value for flavor, color, size or other characteristic, but unsuitable for general planting.

Fruit lends itself so well to decorative effects, that it might not be out of place to offer prizes for collections arranged for the decoration, either of shop window or of an exhibition table.

The classification of apples as "Commercial" and "Amateur" is much better than "Dessert" and "Cooking" or "Summer," "Fall" and "Winter." There seems little reason for offering prizes for "collections" in commercial varieties, except it can be done so as to discourage the growing of a large number of varieties. If "collection" prizes are offered in any class there should be a distinct understanding as to whether any consideration is to be given to the judgment of the exhibitor in the selection of varieties, or other points than the quality of the individual fruits.

It will be noticed that special attention is directed to fruit in packages, whether barrels, boxes, baskets or crates.

In this connection, might I urge the necessity of expert judges in fruit? By this I mean men who have some other qualification than that they can name half a dozen or half a hundred varieties of fruit. We want men of wide experience in growing and selling fruit, and even among such men it is essential that there should be some understanding as to the general principles that underlie fruit judging, and some knowledge of the specific rules that govern their application. It is to be hoped that the Ontario Agricultural College, or the Ontario Fruit Growers' Association will call a conference of fruit men to lay down general principles and provide for instruction classes in fruit judging. Score cards should be constructed and their use insisted on in all cases where the exhibitor asks for it. With proper standards established, there would be a possibility of comparing the fruit at one exhibition with that of another, and it would be possible to send intelligent descriptions by mail—something that cannot be done at present.

I have not suggested varieties in a model prize list. Perhaps the most helpful list of apples and pears is that found in Mr. McKinnon's bulletins on the "Apple Export Trade" and "Pear Export Trade." This is a matter that should receive the attention of the fruit men of the Province.

There should be some supervision in the matter of special prizes, even when the general principles appear to be followed. For instance, a special prize was offered at one of the fairs for the best barrel of Snow apples. In the judgment of the best fruit men the Snow apple can never be shipped to perfection in barrels, and hence to offer a prize for a barrel of Snows is to perpetuate an evil generally recognized in the trade.

All fruits should be named. There is room for much improvement in the methods of doing this. Even when a near view of the fruit is possible, the name is not prominent enough to be easily read.

Only at two fairs of the nine which I visited was it possible to get an intelligent view of the fruit. In all the other places it was fenced off by wire screens or otherwise, in such a way that the educational feature was largely lost. I would also suggest that if a judge is competent he should remain with the fruit during the greater part of the day after the judging is done, so as to give information on all points that may be suggested by the patrons of the fair.

It can serve very little purpose to give prizes that will be carried out of the neighborhood in which the fair is held. The mere looking upon fine specimens of fruit on a table is of no great educational value, unless there is an incentive to make further enquiries about it; and unless the fruit be grown in the neighborhood it is not at all likely that further attention will be given to it. I would, therefore, recommend that fruit that has once taken a prize be so marked, by cutting or otherwise, that it would not again be eligible.

(5) Co-Operation with Town Councils, Local Boards of Trade, Etc.

Last spring we had an application from the Orillia Board of Trade, asking us to visit their town and surrounding country, and to advise them in reference to the best way of co-operating with the farmers in the community, that the average farm might be made more profitable. Accompanied by Mr. A. McNeill, Senior Fruit Inspector of the Dominion Government, your Secretary visited Orillia and the surrounding country, and held several orchard meetings. The result has been to stimulate more inquiry in reference to fruit matters in that district than from any other point in Ontario. I believe that the best citizens of our towns and villages are only too willing to co-operate with the farmers in the matter of buying their supplies and selling their products.

The following is a clipping from the Orillia "Packet," in reference to our work there:

The Fruit Commission Conducting Investigation in this District.

"Messrs. G. C. Creelman, Secretary of the Ontario Fruit Growers' Association, and Mr. A. McNeill, of the Fruit Division, Ottawa, reached Orillia on Tuesday, to conduct an investigation into the fruit industry in this district, at the request of the Board of Trade. They went at once to Mr. C. J. Horn's orchard, which they inspected. They also met and conversed with a number of fruit growers in that vicinity. Among those present were Messrs. R. A. Lehmann, Secretary Farmers' Institute ; C. L. Stephens, President of the Horticultural Society ; Jesse Ryerson, A. E. Dudenhoffer, John Keenan, Wellington Fisher, and others. The subject most discussed was top-grafting. The concensus of opinion was that the Talman Sweet made the best stock, though Duchess and Gideon were held to be good.

In the evening Messrs. Creelman and McNeill held a conference with a few of the members of the Board of Trade, at which the possibilities of the fruit trade in that district were discussed. The President, Mr. R. O. Smith, presided, and explained that the object of the Board was to assist in developing the fruit industry around Orillia. In the past it was understood that the farmers had suffered much loss through lack of exact information as to what varieties of apples were adapted to this climate, and it was hoped that the Commission would be able to make recommendations that would prevent such mistakes for the future. The members of the Board had no direct interest in fruit growing, but were simply inspired by a desire to aid in the general prosperity of the district.

Mr. Creelman, in replying, spoke of the great advances that had been made in capturing the British Markets for Canadian products, particularly in the case of cheese and pork. At the present time the Government was bending its efforts towards securing a similar development in the Canadian trade in apples and chickens. The British people were acquiring a taste for Canadian apples, and the object was to furnish them with fruit of good quality and in good condition. They believed the agitation had reached a stage where the only way to advance it further was by going around personally among the farmers and discussing the question with them in their orchards, and this was what they proposed doing around Orillia. The trouble was that every farmer had been running an experiment station of his own, and instead of growing large quantities of standard varieties they were turning out sample lots of all sorts of apples. The thing to do was to decide what varieties were best suited to this district, and then grow them in large quantities, so as to attract buyers. Mr. Creelman ended by saying that he and Mr. McNeill placed themselves at the services of the Board of Trade during their stay here.

Mr. McNeill opened by complimenting the Board of Trade on its enterprise, and expressing pleasure in assisting them in the laudable work. He discussed the fruit question from a dollars and cents standpoint, claiming that an average profit of $50.00 an acre could be got from an orchard, and that in eight years after planting, lands worth $50 an acre to begin with, could be advanced to $500 an acre. He did not wish to anticipate the conclusions he would reach as a result of a more thorough investigation, but so far as his observation had gone, he believed this district was well suited to apple culture, though he would not recommend the planting of orchards on land that was sandy. He hoped to see the day when one hundred thousand barrels of apples would be shipped out of Orillia—and if they were all of one variety, so much the better. Mr. McNeill discussed varieties, difficulties and suggestions for promoting the fruit industry, in an informal way, with those present He promised more definite proposals at a later date.

Messrs. Creelman and McNeill visited Rugby and Hawkestone yesterday, meeting some of the fruit growers at Mr. Robert Anderson's, Rugby, in the morning. To-day they will be at Mr. Ben Teskey's, Warminster, in the morning, and at Mr. Matthew Baird's, Jarratt's Corners, in the afternoon. Mr. Creelman returns home to-day, but Mr. McNeill will go across the lake to-morrow (Friday), to meet the fruit growers at Mara He will be at Mr. Robert Calderwood's, Atherley, at 9 a.m., and will go from there to the orchard of Mr. Geo. McCormick, M.P., in the afternoon, and hopes to meet a number of those interested in the subject and discuss the situation with them. He will visit Ardtrea on Saturday morning, and be at Mr. Jas. Kean's at 9 a.m. This will conclude the investigation for the present.

(6) Fruit Packages.

As a result of the discussion on apple boxes at the Walkerton meeting, quite a number of inquiries were received during the season in reference to this kind of package. On March 19th I received the following letter from Mr. W. A. McKinnon, Chief Fruit Division, Ottawa :

"Ottawa, March 19, 1903.

"Dear Mr. Creelman.—It has been brought to my attention that there is a movement on foot to have certain packages adopted for the export trade in fancy fruit. I see by The Horticulturst that some shippers have adopted a certain size of box for this trade.

"The matter of packages was discussed at the Nova Scotia Fruit Growers' meetings, and has been talked of informally at a number of meetings since. I therefore take this opportunity to impress on you, as Secretary of the Ontario Fruit Growers' Association, the great desirability from the point of view of the British trade (as expressed by great numbers of them to me) of having uniform packages throughout Canada. This uniformity should extend only to the weight of the fruit to be put in the packages. It is in no way harmful, in fact I think it desirable, that each section of the country should have some distinctive mark, either in the shape of the box or in the branding of it, which will serve to identify it in all markets.

"The trade in Great Britain asks for a uniform barrel, preferably one to hold 140 pounds net, of fruit, and for a uniform box, holding 40 pounds net, for apples, and a uniform half case holding 20 pounds net, for pears. If it is possible, by communicating with the various Fruit Growers' Associations, to arrive at an understanding on this matter, I think it would be infinitely better than to let the subject be taken up, and disposed of in different ways by different associations."

I wrote Mr. McKinnon, asking him for his views on the box question, to which he replies as follows :

"Ottawa, April 9, 1903.

"Dear Mr. Creelman,—As requested by you, I send you a memo. of my views with regard to the box question.

"The main essential, as stated by the trade in Great Britain, is that there should be uniformity in the quantity of fruit contained in Canadian packages which are presumably of the same size. The trade asks for a pear half-case containing as nearly as possible 20 lbs. net of fruit; and an apple case or box holding as nearly as possible 4 lbs. net of fruit. It is essential that both of these packages should be of strong material, and should not be flimsy. I should not recommend the use of a box, the ends of which were less than 5/8 of an inch or the sides less than 3/8 of an inch, though some have had success with a package the sides of which are only one-quarter inch.

"Now, with regard to the adoption of a standard package by the Ontario Fruit Growers' Association, I do not wish it to be thought that the Fruit Division is meddling with affairs which should be left entirely to the decision of the Association. Please consider any suggestions coming from this office as being intended for the good of the entire Canadian trade. Realizing that the box is going to be more used in the future, I think it extremely desirable that all the Fruit Growers' Associations in Canada should agree upon the same box for the export trade. As I have written you before, it does not matter if the box varies in shape, in height or length, so long as it may be depended upon to carry always approximately 40 lbs. of fruit. Very little packing material should be used; the trade does not take kindly to the handling of Canadian excelsior in fruit packages.

"I would suggest that your Association should consult with the other Fruit Growers' Associations, either by correspondence or by the holding of a conference at some central point, which delegates might attend. It is possible that correspondence might be a satisfactory method for dealing with the box question alone, but there are other important problems affecting the entire Dominion, such as the transportation question, and if these subjects were all considered together, it might be well worth the time and expense of a conference. In any case, it would be very regrettable if Nova Scotia, Prince Edward Island, Quebec, Ontario and British Columbia each adopted a distinctive package of its own for the export trade, so that the British purchasers would need to be experts to know just what quantity of fruit they were being offered when a "box" of Canadian apples is offered for sale.

"I am enclosing for your consideration a memo. of the dimensions of various packages already in use. I might add that one of the most prominent growers in Prince Edward Island uses a box wider and shallower than any of the others mentioned, and made of very heavy material. You will observe that there is not, apparently, such a thing as "California package," in the sense of there being one package of the same dimensions used throughout the State."

Commencing an inquiry, we found a great many different sizes of boxes in use, and fruit men differing as to the quantity that should be put into a box. People are pretty well agreed, however, on one of two boxes, either a bushel box, which would go three to the barrel, or a forty pound box, which is four to the barrel.

With the scarcity of barrels this fall the question of boxes has come with more force than ever, and I think some recommendation should be presented by this Association in reference to a uniform box for the whole Province, and if practicable for the whole Dominion of Canada.

(7) Our Annual Report.

Our Annual Report this year was very late in coming from the press. It was prepared and sent down to the King's Printers at the usual time, but, owing to the prolonged session of the Legislature. the printers gave as their excuse that they could not get out the report until the Legislature adjourned and the printing incident to it had been cleared up.

Personally, I am very much pleased with the appearance of the report, both the binding and subject matter. Published in one volume with our own are the reports of the work of the Fruit Experiment Stations, New Fruits of Ontario, and the proceedings of the Entomological Society. In our own report, I wish to call your special attention to the department devoted to the work of the Horticultural Societies, and particularly to the series of articles written by Mr. Hunt, O.A.C., Guelph, divided as it is into the special work of the different months of the year. We were also enabled to use good paper and good cuts for this part of the report.

(8) Horticultural Societies.

Soon after our winter meeting last year, we began the work of helping the Horticultural Societies in our towns and cities. We believe this to be a very important work, and, while this Association has been criticized for having on its Board men who are more directly interested in flowers than fruit, I think that the result of their efforts in the beautifying of our towns has justified their re-election from year to year.

On February 4th the following letter was sent out to our Horticultural Societies :

"Toronto, Feb. 4, 1903.

"Dear Sir,—The past year marks an epoch in the advanced work of our Horticultural Societies. The April meetings were reported to have been the best ever held in the history of many societies. Our lecturers returned well pleased with the reception they met everywhere, and expressed themselves as believing that the societies were doing a good work.

"We write at this time to ask if your society would like us to send you a speaker again this year. A number of good lecturers have promised us their services, and everything points to a splendid series of meetings in March or April.

"For the past two years our lecturers have, under the auspices of your society, visited the schools in the afternoon, and I would suggest that this feature be continued. It is not only helpful to your schools, and beneficial to your children, but at the same time it advertises the meeting of your Horticultural Society, to be held the same night.

"I am glad to say to you that the Fruit Growers at their last annual meeting at Walkerton, prepared a special programme for the delegates present who represented the Horticultural Societies. These special sessions were crowded to the doors each time, and it is the intention of the Association to hold other sessions for those interested in floriculture and home decoration at the time of the Annual Meeting in December. We hope your society will be represented at that meeting, and that your delegates may receive much inspiration at that time.

"I have just been informed by the Minister of Agriculture that the Annual Report of the Fruit Growers' Association, the Ontario Entomological Society, and the Ontario Fruit Experiment Stations, will be bound in cloth and sent to each member of the Fruit Growers' Association. As this volume will contain the report of the papers read and addresses delivered on horticultural matters at the last Annual Meeting, together with the discussions following each topic, it should be of particular interest to your members.

"I am pleased to say further that the 'Canadian Horticulturist' is steadily improving, and that we are continually receiving many kind words from our subscribers in reference to it. We ask for you continued support in the publication of this journal, and we would be glad to have any items of news from your society for publication in its pages.

"In reference to the plant distribution, I would say that some of the societies have expressed a wish to purchase plants of their own selection, and where such a desire is expressed, the Executive Committee have decided that where a plant is not selected the affiliation fee for each member shall be 75c, instead of 80c, as heretofore.

"We want to know at this time if our efforts are meeting with your personal approval. We ask this because a circular has been received from the Cobourg society, in which charges are made against our Provincial Association, which, so far as we know, are groundless. We are trying to help the Horticultural Societies in every way, but if our efforts in this direction do not meet with your approval, we should like to know in what way we can be of further service to you.

"In the circular referred to above, it is also stated that a public meeting will be held in Toronto, February 13th, to form a Civic Improvement League. If such a League be formed, it will, I presume, be in affiliation with, and under the rules and guidance of, the American League for Civic Improvement.

"I should like an expression from you at this time in reference to the work of your own Horticultural Society, which is distinctly Canadian. I enclose a separate slip, which, if it suits your views, you might sign and return to me before the 13th. This action on your part will enable us to complete statistics re the working of the Horticultural Societies in Ontario, and would also be an indication to the Ontario Department of Agriculture that the distribution of the annual grants by the Department is justifiable.

"Wishing you continued success, and hoping to hear from you in reference to the lecturer, I remain, yours truly."

The following reply was received from forty-one Societies:

"I beg leave at this time to testify to the good work being accomplished by our Horticultural Society. Under the Agricultural and Arts Act, we are permitted to assist our town members in matters of civic improvement, and our country members in the science of fruit-growing, gardening and floriculture. We believe that it is in the best interests of the entire community thus to bring the town and country people together, and anything that would tend to divorce these elements would in my mind be a step in the wrong direction. I further believe that the lecturer sent to us each year is a help to us in our work, and we trust that the practice will be continued.

"The 'Canadian Horticulturist,' while not perfect, I believe to be improving each year, and in my opinion it contains much information in each issue that should be helpful to our members.

"I feel that under our present conditions, we are doing good work in the community, and that there is nothing in 'The Act' nor in the constitution, rules or regulations to prevent us continuing the work of civic improvement or the improvement of our country homes and homesteads."

It was very gratifying to read the replies from the officers of the Horticultural Societies throughout the Province, and I trust that this Association will see fit to continue to help in the work so well carried out by these local organizations:

(9) Lecture Courses for Horticultural Societies.

Division 1. Delegate: T. H. Race, Mitchell, Ont.

Seaforth	March 16	Owen Sound	March 20	Hespeler	March 25
Kincardine	“ 17	Elora	“ 21	Brantford	“ 26
Mt. Forest	“ 18	Elmira	“ 23	Paris	“ 27
Walkerton	“ 19	Waterloo	“ 24	Cayuga	“ 30

Division 2. Delegate: Wm. Hunt, O.A.C., Guelph.

Toronto Junction	March 30	Hagersville	April 3	Stratford	May 1
Grimsby	“ 31	Tillsonburg	“ 6	Toronto	“ 5
St. Catharines	April 1	Simcoe	“ 7	Aylmer	April 9
Niagara Falls	“ 2	Port Dover	“ 8		

Division 3. Delegate: T. H. Race, Mitchell.

Bowmanville	March 31	Stirling	April 4	Midland	April 17
Millbrook	April 1	Picton	“ 6	Woodstock	“ 21
Lindsay	“ 2	Cardinal	“ 8		
Peterboro'	“ 3	Orillia	“ 16		

When arrangements were completed the following letter was sent to the Secretaries of the Societies:

Lectures Before Horticultural Societies.

"Toronto, March 4, 1903.

"Dear Sir,—Below will be found a list of the dates and places where arrangements have been made to hold meetings of the societies in your district during March and April. We have very carefully selected the speakers for these meetings, and trust that your members will not be afraid to ask questions and obtain as much information as possible from these gentlemen.

"Last year the lecturers visited the schools in the afternoon and addressed the school children upon some topic connected with horticulture. This seems to have been appreciated, for we have had many applications for similar instruction. We hope you will make arrangements, where possible, to have this feature of the work repeated, for, beside the interest the children may take in it, it will be a good advertisement for the evening meeting.

"There seems to be a revival of interest in horticultural matters generally at this time. The Ontario Fruit Growers at their last Annual Meeting arranged special sessions for floriculture and town improvement topics. These meetings were crowded at each session, and a report, in full, of the proceedings, bound in cloth, will be mailed to each of our affiliated members as soon as published.

"Trusting that you may have a successful meeting and a prosperous year's work, I remain."

As an example of the work done at the Horticultural Society meetings, I quote you here from the report of Wm. Hunt, O.A.C., Guelph:

" Meeting held at Toronto Junction March 30th. Attendance 50. Subject: Hardy Border Perennials. Audience very much interested.

Q. How often should German Iris be planted, and at what season of the year?

A. About every third or fourth year. The Iris being early flowering, is best planted in the fall (September).

Q. What size should the clumps be?

A. From five to ten crowns.

Q. Do you consider the double white Lychnis a good border plant?

A. Yes, decidedly so. The Lychnis Vespertina (double white) being quite hardy and very free flowering.

Grimsby, March 31. Attendance 75. Subject: "Planning and Planting the Home Grounds" Audience large, very much interested. Apparently well pleased.

Q. My hardy roses are not doing very well, the soil is very sandy and gravelly. What do you recommend?

A. Either take your roses up entirely and take out the sand and gravel to the depth of at least twelve inches, and fill in the bed with a compost of clay loam enriched with about one-third of well-rotted manure, then plant your rose bushes again. The roses if taken up should be heeled in whilst the bed is being prepared. If you cannot lift the roses, take out as much of the soil around them as you can without injuring them and put the compost before mentioned in its place.

Q. What would you recommend to keep down insects on roses ?

A. For the rose slug or worm, sprinkle the bushes just before the buds appear with dry hellebore early in the morning when the dew is on the foliage, or just after a shower. Repeat the operation once a week until the bushes are well in bloom. A weak solution of Paris green water, made by thoroughly dissolving about half a teaspoonful of Paris green in a small quantity of water first, then add water sufficient to make a gallon of the solution. Spray this on the bushes once or twice before the buds open. Apply this solution when the foliage is dry.

Q. Are Tigridia bulbs hardy here ?

A. No. Tigridias are not considered hardy here.

Q. Do hardy roses succeed best in shady positions ?

A. No. Not in the closely shaded positions, but partial shade for a few hours on hot days in the middle of the day is beneficial to the blooms, preserving them longer.

Q. Should outdoor bush roses be severely pruned ?

A. Yes, the strong shoots of young or last season's wood should be cut back, leaving about four to six inches of young wood. Cut out altogether all small weak shoots.

Q. Should hardy climbing roses be severely pruned ?

A. Not so severely as the bush roses. Select first of all the strong, vigorous canes you wish to leave, shorten these back to about four feet from the old wood, and trim out the very small weak wood altogether.

St. Catharines, April 1. Attendance 40. Subject : "The Propagation and Care of Window Plants." Only a fair-sized audience, very interested throughout. Invited to return at some time in near future to deliver an address on "Civic Improvement" and "How to Beautify Public and Private Grounds," the Mayor and others being very much interested in these matters.

Q. What would you do with a pot of daffodils that have flowered in the window and have died down ?

A. Leave the bulbs in the pot, and put the pot in a cool place in the shed and keep them dry, when you can plant them outside in the garden in September. They are no further use for window culture.

Niagara Falls South. April 2. Addressed Public School scholars at 3 p.m. Gave particulars re culture of Asters, as the Horticultural Society is distributing 300 packets of Aster seed. Young people very enthusiastic. Meeting in evening at 8 p.m. About 50 present Attentive audience.

Q. How shall I treat a Calla Lily when it has done flowering ?

A. Give it less and less water from now until June, when you can lay the pot on its side under the shade of a tree or fence, and give it no water until the end of July, when you can bring the pot out into a partially shaded place, and start it into growth by watering it, or you can repot the tubers if they require repotting, but do not give it too large a pot, as that means a lot of leaves and no flowers.

Q. What kind of Asters are the best to grow ?

A. The various types and colors of the Victoria Aster are considered the best. The Semple's branching Aster is the strongest growing and blooms very freely, but the blossoms are not as nice, either in shape or color, as the Victoria Aster. I consider the latter the best type of Aster.

Q. What do you do to increase the size of Aster blooms ?

A. By pinching off the small lateral flowers on the sides of the stem you will increase the size of the terminal blossoms.

Hagersville, April 3rd. Addressed pupils of Public Schools at 3 p.m., and gave address on "Culture of Asters," as the Horticultural Society is distributing Aster seeds to scholars for an exhibit in fall, at my request. Meeting of Horticultural Society in evening. About 40 present. All very much interested. Gave composite lecture on "Window Plants," "Civic Improvement," and "Planning and Planting the Home Grounds."

Q. Which variety of Begonia do you consider best for window culture?

A. The spotted leaf variety, Begonia Manicata Aurea, is the most enduring variety, and its foliage looks bright and pretty at all times.

Q. What strawberry do you consider to be the best variety for home use?

A. The Clyde.

Q. What is the best time and method of pruning flowering shrubs?

A. By starting when the shrubs are young. Almost all of the flowering shrubs can be pruned when in flower by thinning out the most prominent shoots. The trimmings can be used for indoor decorative purposes if cut when in flower. If shrubs are large and have been neglected prune in autumn or early spring. Never clip flowering shrubs with the shears. Lawn Hydrangeas require pruning back severely in fall or early spring, leaving as a rule only four or five inches of the young growth.

Tillsonburg. April 6. Addressed Public School scholars, 200. High School 75. Induced Horticultural Society to distribute Aster seeds. Gave talk on "Aster Culture." Children very much interested. Good meeting in evening in Town Hall. 75 present. Subject: "Window Plants, Civic Improvement, and Planning and Planting the Home Grounds."

Q. When is the best time to prune Maple trees?

A. Hard or sugar maples are best pruned sometime during July and August. The soft maples and sycamores are better pruned later on in the fall or very early in the spring.

Q. Can tuberous-rooted Begonias be grown in the window during the summer?

A. Yes, by securing some tubers about this time and starting them in sandy soil in small, well-drained pots, and repotting them into larger pots when the growth is three or four inches in length. Good, rich, loamy soil should be given them when potted the second time. Do not give them too much water until the tubers have started well into growth. A too sunny position in the window is not advisable for tuberous Begonias.

Simcoe. April 7th. Addressed Public and High School scholars, about 300, and inspected new park. Horticultural Society here will distribute Aster seeds or plants next year, perhaps this year. Meeting in Town Hall in evening. Good attendance. Composite lecture same as at Tillsonburg. Great interest shown on remarks re "Civic Improvement."

Q. Why is it that so many coarse kinds of grasses are often seen on lawns, and finally kill out all the finer grasses?

A. Imperfect drainage, both of the surface and sub-soil of the lawn, is oftentimes responsible for the appearance of coarse weeds and grass and other noxious weeds on a lawn. An exhausted soil is often the cause of the finer grasses dying out. Drought in summer also allows the strong coarse weeds to overpower and kill out the finer lawn grass.

Q. What are the best grasses to use for seeding a lawn?

A. A mixture composed of a pound each of the following varieties of grasses and clover makes a good lawn mixture, viz., Agrostis Vulgaris, Agrostis Alba, Agrostis stolonifera, Poa pratensis or Kentucky Blue-grass, one-half pound Dutch Clover.

Port Dover. April 8. Addressed Public and High School scholars 3 p.m. Horticultural Society will probably make a distribution of Aster seeds to scholars. Meeting in Town Hall, 8 p.m., about 75 present. Mixed subject for lecture same as Simcoe. Audience interested and pleased.

Aylmer. April 9. Had splendid reception here. Was conducted by Mr. D. H. Price, Sec.-Treas. County Fair, Reeve and others to the Public and High Schools. Addressed scholars on Floriculture, particularly Asters, as Horticultural Society is distributing seed to scholars, flowers to be exhibited at County Fair in September. Good meeting, 75 in evening. Composite lectures as before. Have since sent Mr. Price particulars to govern Aster exhibit.

Q. When do you consider the best time to prune the hard maple?

A. From July to October.

Q. Do you consider the Norway Spruce a good lawn tree?

A. No, not for small lawns. The Norway Spruce requires a great deal of space (25 to 30 feet) to develop their full beauty. They are then really beautiful trees. The miserable-looking clipped specimens we usually see on small lawns do this noble tree scant notice. As wind-breaks these spruce are useful, or they will make noble, graceful specimens where they have plenty of room to grow and develop themselves.

(10) Toronto Industrial Exhibition.

As one of the representatives of this Association on the Fair Board of the Industrial Exhibition, I beg leave to make the following brief report: As in former years, the building was found to be unfitted for the needs of the fruit business, in fact, the entire building devoted to fruit and flowers would not be too large for either display by itself. As a result of the cramped space and the poor facilities for showing, a large number of the fruit men met in the Farmers' Institute tent, during the time of the Exhibition, and appointed a committee to confer with the Industrial Board, with a view to improving the conditions at the fruit building. At the Directors' luncheon, also, the same day, Dr. Mills, of the Agricultural College, and Mr. T. H. Race, of Mitchell, made emphatic speeches showing the absolute necessity for the Fair Board taking some action in the very near future. As a result of all these objections, the Exhibition Board are at this time preparing a by-law to submit to the ratepayers of the City of Toronto, asking $25,000 to be voted for the purpose of erecting a new building for fruit on the exhibition grounds.

In a conference with the Secretary of Toronto Exhibition a few days ago he informed me that extensive improvements were contemplated on the fair grounds during the coming season, and that the very first move would be in the direction of a new building for the exhibition of fruit. The Secretary also required me to bring the matter before this Association and asked that a committee be appointed, or the Executive instructed to consult with the Toronto Fair Board in reference to plans for the new building.

The Fruit Exhibit of 1903.

On the whole, I think the fruit exhibit was fully up to that of other years in quantity and in many cases better in quality. In many classes the competition was quite keen. In the large collection of apples the first prize was taken by our director from the Quinte district, Mr. W. H. Dempsey. His exhibit was admired by everyone entering the building. The second prize was also won by a Bay of Quinte man, and the third went to Hamilton. In all sections in the apple classes the competition was close, and an exhibit to take first prize had to be of the very highest quality.

In apples and pears the bulk of the prizes went to the Niagara district, while in peaches and plums the same district was also successful, although the exhibit by Mr. W. W. Hilborn, of Leamington, showed plainly that had he been a competitor the Niagara people would not have won so easily.

In grapes there was a grand exhibit, and it took the judges nearly the entire day to get through their work. Most of the prizes went to the Niagara district, Mr. W. J. Stewart, of Homer, winning the silver medal for largest collection. St. Catharines was second and third, while the other prizes were distributed throughout the peninsula and Burlington district.

In the district competition the Township of Niagara and the St. Catharines Horticultural Association were the competitors, the latter was awarded the prizes, not because of the superiority of its exhibits, but for the reason that the Niagara people had not complied with the rules in reference to labelling their exhibits. This has caused a good deal of hard feeling, and I have been asked, as representative of this Association, on the Toronto Fair Board, to take the matter up and help sustain the protest made at the time by the Niagara people.

I think the time has come when we should encourage the exhibit from districts. In this way the large number of visitors, who attend the exhibition every year, will become impressed with the suitability of districts for certain kinds of fruit growing, and those districts will soon become noted for the kind of fruit best suited to their soil and conditions. English live stock men have for years pursued this policy; one county is noted for a certain kind of sheep, another county for breed of cattle, another district for heavy horses, etc., and people going in to buy stock in England move directly to one point and complete their business. If this could be done in Ontario with our fruit business it would cut out the necessity for so many middle men, and large buyers could be directed to one point and there secure car loads, and if necessary ship loads of a single variety.

Fruit Stations.

It would be like reading a catalogue to discuss the exhibits of our fruit stations. They were admired by everybody, and I would suggest that hereafter whoever may be employed as Superintendent of these exhibits be requested to prepare an accurate report of this part of the exhibition, that it may be published in the Report of the proceedings of our annual meeting.

Practical Demonstrations.

Mr. A. McNeill of the Dominion Fruit Department, and his associates were located in the Implement building, and disseminated an enormous amount of information in reference to the handling of fruit. Young ladies were constantly engaged in packing and unpacking boxes, answering questions, and giving information in reference to the grading and packing of fruit. All who saw this work commended it highly, but unfortunately there was not room in the fruit building, and only those interested in farm machinery came in contact with Mr. McNeill and his assistants. In the new building this Board should recommend that provision be made for practical demonstrations on all important matters pertaining to fruit growing, and a large auditorium should be provided for lecturing and demonstration work along fruit lines during the progress of the fair.

(11) Canadian Horticulturist.

On the subject of this publication, your Executive Committee have given a great deal of thought, and we think the time has arrived when something definite must be done to change the general style, appearance, and subject matter of this important magazine. Probably during the last twenty-six years, no one factor has done as much for improvement of fruit and flowers in Canada as the "Canadian Horticulturist." Further than this, there is no doubt that it is still an important factor in certain directions; but at the same time, we find it almost impossible to get paying advertisements for the "Canadian Horticulturist" in its present form. I think there is room for an up-to-date horticultural journal containing many times the amount of reading matter which we publish. It should contain market reports; the work of our Experiment Stations; methods of co-operative buying, selling, and shipping; prices of materials; interviews with nurserymen, fruit growers, commission men, and transportation companies; it should also have a strong department on the subject of "Fruit as Food," including cold storage, preserving, pickling, etc. Further, there should be a strong department devoted to Horticultural Societies. This is now being done to some extent under the term of "Civic Improvement," but nothing definite is being published from month to month as a guide to Societies in their work. It has also been suggested that the Dominion and Ontario Departments of Forestry be asked to co-operate with us with a view to establishing a department in the journal on this subject. These are matters for your consideration, and I hope they will be thoroughly discussed at this time.

Wm. Rickard, M.P.P.: I have listened with a great deal of interest to this very important report. In reference to the action taken in connection with the exhibition in Toronto, that was a splendid idea, and the way the Secretary brought it before the exhibition authorities, and obtained the promise that there should be a certain amount of money expended and provision made for the proper display of fruit, is very commendable.

A. McNeill: The Secretary has shown by his report that he has been at work in connection with the Executive during the year, and I think the meeting should either commend or criticize the work done. For my own part, I have worked in hearty accord with Mr. Creelman on the Executive this year, and can specially commend his spirit and aims and the whole-hearted way in which he takes hold of things and carries them out.

The report is so large that I can only select one or two of the vast number of subjects dealt with during the year. First, in the matter of local organization; I feel that this is a most important work. If he had done nothing else than take up this work he would have earned laurels for it alone; it lies at the base of successful fruit growing. It is the market end of the business in which we must now interest ourselves. I think we should do less educational work at these conventions; the day has passed for that here. I would continue that work with all the vigor we can put into it through the local Associations, while for the next few years we devote our attention to the market end of the business. I most heartily support him in his desire to make this Association commercial. I use the term advisedly—commercial in its aims. This matter of buying, selling and securing markets and buying materials co-operatively is quite within the scope of the organization. I think we might even enlarge our scope and appoint an organizer to look after commercial matters, who would be a specialist; an officer who would keep in close touch with the Secretary and Executive. It may be that the Secretary could do this work; but there is need of an officer who, having surveyed the whole field, could be called upon to go and organize any particular section for a specific purpose. Suppose in some apple-growing sections the prices obtained by the growers have not been what they should be. In some districts, for example, this year the farmers received only 75 cents for good winter apples. In such instances it would be in the interest of the fruit-growing industry to get right into such districts and organize them. We have come to the point when we must regard the selling of our neighbors' fruit as of just as much importance as the selling of our own, and until we recognize that thoroughly we shall never have this thing on a real commercial basis. In districts where, say, twenty canning factories consolidate into one, what chance has the unorganized fruit grower?

Regarding fall fairs, there are enormous opportunities for education at these fairs; but we have got to systematize these things. We have had very good judges at these fairs, but there is need of a little education even among expert judges of fruit. The stock men have come to the conclusion that even the best of them do not know it all, and that it is necessary to have schools in judging; but we fruit growers do not seem as ready to adopt this idea. Expert judges should be instructed, if for no other reason than that there may be uniformity in their decisions. I have observed the greatest diversity in this connection, which is simply the result of want of organization and lack of uniform standards. The report is, I consider, a most valuable one, and the only thing that will spoil it is to pass it over and say nothing at all about it.

The President: There are a large number of important matters in connection with it which ought to have fuller consideration before it is finally closed, but on account of the fact that a number of subjects touched upon in the report will be taken up more fully in connection with our general program, it is probably well to leave the matter in your minds for the present for consideration, and when those particular subjects come up, what you have heard in the report will probably throw more light upon them.

Thos. Beall: Referring to the exhibit of fruit at the Toronto Industrial, I should like to ask whether it is wise to exhibit at that exhibition, which is held in August and September, our best winter apples, as they are not mature at that time.

G. C. Caston: With regard to the Fruit Experiment Stations' exhibits, I have maintained for some years that it is not the proper place for the Stations to exhibit at all. The local district shows, which are usually held late in October, would be the place for them to exhibit. They would then come into contact with the people for whom the stations are working. In the Northern part of Ontario the Northern Spy, for instance, does not develop and color till the end of October. If you show it at Toronto in September, the people do not know what variety it is. There is nearly three weeks' difference between southern Ontario and North Simcoe, where I live, in this respect, so that when we come to exhibit these varieties side by side with specimens grown in the south, it is not a fair comparison, and does not do our apples justice. I think, therefore, that Toronto is the wrong place at which to make an exhibit from the stations.

Q.: Why not exhibit at both?

G. C. Caston: If we are to exhibit at both, all right.

J. L. Hilborn: I am entirely in sympathy with this view, and think there should be an exhibit in the county where the station is located so that it may be an education for the men in that locality.

R. B. Whyte: Fruit should never be exhibited till it is mature; it does nothing but harm otherwise.

The President: I think there might be a revision of the prize list to cover that matter. So far as the Experiment Stations' exhibit is concerned, immature varieties might be left out till the local fairs meet.

G. C. Caston: Even our fall apples are not mature until the first week in September, except, perhaps, Duchess and Astrachan.

A. D. Harkness: It is the first of October with us before the Fameuse varieties mature and have their color developed. You will all bear me out in saying that apples grow more in proportion in the last two weeks before ripening than all the rest of the season put together.

G. C. Creelman, Secretary: I think that the meeting ought to take some action in reference to the prize list at the Toronto Fair. When I was talking with the Secretary lately, I asked him what about the prize list. He said that this Association had never taken much interest in the prize list. I asked him if he wanted us to, and he replied that if we would have a committee appointed at our meeting to go over the prize list and say what we should like, they would endeavor to meet our views as far as possible.

In reference to exhibiting winter apples, while they may not be mature, we must not overlook the fact that we have at Toronto an opportunity of exhibiting our fruit to many thousands of people, thus advertising the varieties of fruit grown in Ontario. As the present Fair Board is going to prepare the prize list for next year, before Christmas if possible, it would be well for our committee to take the matter up with them at once.

Murray Pettit: Is it not better to exhibit these later varieties even if not fully developed rather than not exhibit them at all?

G. C. Creelman: It might look as though we did not have these late varieties in Canada if we did not exhibit them. It might be stated on the exhibit that the specimens were not mature.

Alex. McNeill: There is no reason why we should not secure our fruit a year ahead for advertising and exhibition purposes, placing it in cold storage in the meantime.

Wm. Rickard, M.P.P.: We have lots of fruit ready for exhibition at the time of the Toronto Fair, and I think it is a case where we should do the best we can with the fruit we have at our command at the time.

Harold Jones: As I understand it, the object of the exhibit is simply to demonstrate the capabilities of the various sections of the country, and it is not competitive. The prize list of the Toronto Fair is competitive, and at the date their fair is held we cannot compete with the southern growers. I do not think it is wise to try to bring harmony between the two because the exhibits are made with a different object in view. I think we should exhibit immature varieties, stating on the label that they will not reach maturity until such and such a date. This would give buyers a knowledge of where such varieties could be obtained at a given date.

On the motion of J. S. Scarff, seconded by R. B. Whyte, the report of the Executive was then adopted.

TREASURER'S REPORT, 1902-3.

RECEIPTS.		EXPENDITURE.	
Balance on hand Dec. 1, 1902.	$ 241.56	Canadian Horticulturist	$2,767.80
Members' fees	3,617.59	Salaries	1,200.00
Government Grant	1,800.00	Annual Meeting	297.10
Advertisements	535.71	Commission	289.05
Binding	7.45	Reporting	50.00
Books	43.99	Auditing	23.55
Miscellaneous	11.10	Illustrations	292.74
		Affiliated Societies	14.60
		Express and Freight	7.09
		Postage and Telegrams	177.96
		Collections	7.70
		Committees	160.25
		Binding	6.05
		Printing and Stationery	33.45
		Books	37.29
		Premiums	237.31
		Miscellaneous	13.10
		Balance on hand	642.36
	$6,257.40		$6,257.40

Details of Expenditure.

Canadian Horticulturist: A. A. Plain (copying proof for editor), $5.40; Independent (stationery for editor), $5.00; Buntin, Gillies & Co. (wrappers), $3.68; W. L. Woolverton (mailing), $8.58; Wm. Forbes (postage on "Horticulturist"), $10.56; Canadian Express Co., $3.58; Spectator Co., $2,713.85; L. Woolverton, $8.25; A. Torrey (stationery), $2.00; P. W. Hodgetts (expenses to Hamilton), $3.05; W. Mitchell (express on cuts), $3.58	$2,767.80
Salaries: L. Woolverton, $1,000.00; G. C. Creelman, $200.00	1,200.00
Annual Meeting: Walkerton Orchestra, $20.00; A. E. Sherrington, $8.55; John Craig, $44.35; C. Gripton (stamp), $1.25; H. Snelgrove, $17.80; Wm. Hunt, $4.95; R. B. Whyte, $26.95; A. M. Smith, $11.85; T. H. Race, $10.25; J. Tweedle, $8.55; W. Lochhead, $4.55; J. B. Reynolds, $5.10; C. L. Stephens, $16.55; W. W. Cox, $11.40; J. S. Scarff, $9.55; W. H. Bunting, $11.95; Bryant Press, $33.50; Walkerton Herald, $5.00; Walkerton Glocke, $17.45; Walkerton Telescope, $17.40; express on fruit, $9.70; telegrams, .45	297.10
Commissions: December, $24.80; January, $44.40; February, $72.85; March, $66.55; April, $40.40; May, $28.20; August, $10.00; September, $1.85	289.05
Reporting Annual Meeting: W. B. Varley	50.00
Auditing: A. H. Pettit, $13.55; W. M. Orr, $10.00	23.55
Illustrations: Grip, $283.94; Globe, $1.80; P. W. Hodgetts, $2.00; J. Buchanan, $3.00; F. Shutt, $2.00	292.74
Affiliated Societies: A. McNeill, $5.00; R. B. Whyte, $3.60; Walkerton Telescope, $8.00	14.60
Express and Freight: Can. Exp. Co., $3.00; H. G. & B., $3.05; G.T.R., $1.04	7.09
Postage: Stamps for office, $150.00; stamps for editor, $15.15; cash, $12.81	177.96
Collection: Bank of Commerce, $7.55; Wm. Forbes, Grimsby, .15	7.70
Committees: T. H. Race, $52.75; L. Woolverton, $54.15; W. H. Bunting, $29.60; J. S. Scarff, $7.85; H. Jones, $15.90	160.25

Binding: Brown Bros.	$6.05
Printing and Stationery: A. Torrey, $1.95; Bryant Press, $31.50	33.45
Books:	37.29
Premiums: Evans Seed Co., $72.10; Morris, Stone & Wellington, $58.60; Webster Bros., $106.61	237.31
Miscellaneous: P. S. Mills, $3.00; P. W. Hodgetts, $8.60; G. C. Creelman, $1.50	13.10

Examined and found correct this 20th day of November, 1903.

(Signed) J. M. DUFF, Auditor.

Mr. Race called attention to the greater cost of the Horticulturist this year as compared with last, and it was pointed out that the present year included thirteen months.

The President: It must be a source of satisfaction to the Board that, notwithstanding the large amount of work done during the year as outlined in the report of the Executive, our finances are in such satisfactory shape at the present time, there being a balance of some six hundred dollars on hand, which is a considerable increase from last year.

On motion of G. C. Caston, seconded by A. M. Smith, the report was adopted.

The question of the salary of the Secretary-Treasurer then came up, and was fully discussed. In view of the work being done and the desire of the Board to retain the services of the Secretary, in view of inducements held out to go elsewhere, it was moved by T. H. Race, seconded by G. C. Caston, that the matter be referred to the Board of 1904, with a recommendation that the salary of the Secretary be increased. (Carried.)

R. B. Whyte asked why it was that no representative from this society was appointed to attend the meeting of the American Pomological Society in Boston this year. This is the most important meeting of fruit growers in the world, and we had no exhibit there and no representation. There were large exhibits from different States, and the exhibition was visited by thousands of people.

The President: I think it was an oversight at the last meeting, which was somewhat hurried. It was my intention to attend that meeting, but I was so busy that I could not do so. The point is well taken that we should be represented at this important convention.

DIRECTORS' REPORTS.

It was moved by Mr. M. Pettit, seconded by Mr. Morris, that the Directors' Reports should be taken as read, and submitted to a committee before printing.

Mr. Woolverton and some others thought they should be read and discussed by the meeting, as matters of importance might arise out of them. This view was taken by the meeting, which declared in favor of the reports being read.

Division No. 1.—A. D. Harkness, Iroquois.

With Mr. Lick, I attended a meeting at Iroquois on April 7th, Morrisburg, April 23rd, and at Lancaster on April 24th. At these meetings the process of making the Bordeaux mixture was explained and demonstrated, as well as a practical demonstration on pruning the orchards.

In this district there are so few engaged in fruit growing from a commercial standpoint that it is a difficult matter to organize our Association, and then it is more difficult to make a success of it after it is organized. If, in a district like this where there is not very much fruit grown, some arrangement could be made to have meetings, under the auspices of the Farmers' Institutes, for addresses and discussions on fruit growing, and demonstrations on pruning and spraying by persons who are acquainted with the local conditions, I think much benefit might be derived from it and the Farmers' Institute would be benefited as well.

In this district, I think, there are only three townships in which fruit is grown in any quantity at all, and these border on the St. Lawrence River. In Glengarry there is scarcely any grown, even for local use. Prescott I do not know anything about as yet. In the Township of Osnabruck, in Stormont, there is considerable, but scarcely any in the rest of the county. In Williamsburg and Matilda, in Dundas, there is considerable but not much in the other townships. The apples that do best with us are of the Fameuse class and can be and are successfully grown for commercial purposes, but from my observations I do not think it will pay us to grow the later winter sorts, except for local use—that is, for the farmer to grow them for his own use.

Plums. We cannot expect to grow the domestic plums successfully, as about four years in five the fruit buds will be destroyed. I am trying the American class of plums. Last spring I planted eight Stoddard, eight Hawkeye, and eight Wolf. I got from Dunlop, of Outremont, four Raynes, two Mountain, and two Mount Royal to test them in our district. Small fruits, such as strawberries, currants, gooseberries, and raspberries can be grown successfully.

Division No. 2.—R. B. Whyte, Ottawa.

The principal item of Horticultural interest in district No. 2 during the past year was the unprecedented drought that afflicted Eastern Ontario in the early part of the season. No rail fell from the middle of April till well into June; this, with late spring frosts, utterly ruined the strawberry crop, few growers having enough to be worth picking. The prospect for the coming season is far from good, as practically all the plants put out last spring died before the rain came in June. The later small fruits were not so badly injured. Raspberries were a good deal under the average. Currants and gooseberries were a fair crop, but undersized. The shortage in small fruits was more than made up for by the immense crop of apples, the largest on record in this district. The dry spring was evidently unfavorable to the spread of scab, codling moth, etc., as these enemies of the apples, usually so injurious, were almost unknown.

The splendid specimens of Wealthy, Fameuse, and McIntosh exhibited at this meeting are evidence of the capabilites of this eastern section for growing this class of apples. This year for the first time the local grown fruit was an important factor in the Ottawa market. And it will not be long before our own growers will be able not only to supply the local market, but will have a surplus for export. There have been many thousands of trees planted in the last few years, which are now coming into bearing. We hope that some of the large collection of winter apples exhibited at the Central Experimental Farm at this meeting will turn out to be commercially profitable and prove as well adapted to this district for late winter fruit as those above mentioned are for the early winter months. Again, our Horticultural Society has to report the most successful year in its history. An increase in membership of 38, in the attendance of 137, and in the entries at the different shows of several hundreds, which now average over two hundred per month, all show a very satisfactory growth in the influence of the Society.

A new departure was made this year with the idea of interesting the children of the public schools in horticultural work, three packages of Aster seed each being given to one hundred and forty children, with simple instruction how to plant and care for them. Prizes in cash and Gladiolus bulbs were offered at the September show for the best flowers grown from this seed. The exhibit made by the children, not only in quantity, but in quality was very gratifying to the Society, and the experiment will be continued on a larger scale during the coming season. We also published our first bulletin this year, an eight-page pamphlet, giving lists of the best annuals, perennials and vegetables for the Ottawa district, with notes on their habit of growth and cultivation. It was so well received by our members that we hope to issue similar bulletins from time to time as required.

Division No. 3.—Harold Jones, Maitland.

Since making my last report to this Association I have done some little work in the interest of the Society, and, I hope, of benefit to the fruit growers of my division.

In December last I attended the annual meeting of the Quebec Pomological and Fruit Growers' Association, held at Waterloo, as delegate from this Society. I find that there is more interest being taken in fruit topics from year to year. The attendance was very fair at all the sessions, and the subjects were well discussed by the public, and the fruit display would have been a credit to many of our fruit-growing centres in Ontario.

In January I attended twelve meetings of the Farmers' Institute in my division, and gave practical talks on fruit growing, taking up the question of varieties, and giving illustrations in budding, grafting, pruning, etc.. and in preparing mixtures for spraying, which created much interest, and led to animated discussions at most places.

These talks eventually led to quite a large correspondence with parties asking for hints and advice on location of orchards, drainage, varieties, etc., as well as many samples of fruit by mail for identification.

I replied to all questions when possible in as plain a manner as I could, and I hope it has started many in the right direction.

The experimental fruit plot on my own farm affords an ocular demonstration of the success or failure of many varieties of fruit to many visitors during the summer.

The unusually dry weather that prevailed during part of April, May and first half of June passed the fruit (apples) over the critical part of the season when the most damage is caused by spot ; and, although we had almost continuous rain since June 16th, the fruit is absolutely clean, even on orchards that were not sprayed at all. This fact gave me an opportunity of pointing out to many the vital importance of spraying early and often in seasons of normal rainfall in the spring months, for the season has shown us that if the spot can be kept absolutely in check until the middle of June our crop is practically safe. In past seasons I have found that trees that I have sprayed every week from the bursting of the bud to the first of June, and then stopped, were freer from spot than those not sprayed so frequently and continued to the first of August. This point needs further careful study, for we must admit that we do not know all about spraying yet.

Fameuse, McIntosh and varieties of that group of family are standards for my division, and are the most profitable to grow from a commercial standpoint. For a later keeper we have nothing yet more profitable than Scott's Winter, Golden Russet, and possibly Canada Red, but Milwaukee gives promise of being profitable; though being of large size, it has a tendency to drop during September gales, though not nearly so badly as Pewaukee, which makes that otherwise profitable apple very unsatisfactory to grow. We can grow Spys and Baldwins top grafted, also Kings ; but why not leave these varieties to the lake counties where they excel us every time, and make more and more of a specialty of the Fameuse group, for we are in the great Snow-apple belt of the St. Lawrence valley, where the fruit grows to perfection, and will keep in ordinary cellars until February ?

Among the Pears we have Clapp's Favorite, Flemish Beauty and Ritson, three pears that do well in this division, and are of good quality. Intending planters would do well to stick to these varieties until other pears of good quality are found by the stations to grow successfully, for so many of the so-called ironclads are so poor in quality that there is very little use in planting either for home use or market.

Plums of the domestic class are of very little value in this division. The most successful or promising are Lombard, Gueii. Yellow Egg. and Glass Seedling, but even these will only come through the winter without injury to the fruit buds about two years out of five. Japans are also proving unsatisfactory, being tender in fruit bud. Red June Burbank, Ogon, and Abundance will bear on seasons that are favorable for Lombard. The most satisfactory plums are those of the American type, Wild Goose, Whitaker, Milton, Hammer, Forest Rose, Col. Wilder, Hawkeye, Cherry. Stoddard being the most satisfactory of this class. These plums are fair for cooking, but are of very little value where European plums can be grown. However, they will be a boon to those in the Eastern counties when grown in gardens for family use.

Among the cherries, Ovel and Oshtheim give splendid results, bearing good crops of fair sized cherries. Montmorency is partially tender in bud, only bearing a scattered crop. May Duke is tender in bud, also Reine Hortense. E. Morello is hardy and bears well.

Division No. 4.—W. H. Dempsey, Trenton.

The heavy frost of last December did considerable injury to the buds of the more tender varieties of fruit. Hence the crop of the more choice varieties of plums and cherries was very light; also some of the apples were injured. The early spring being cool and wet, no caterpillars showing, and seeding time being at hand, the farmers took it as an excuse not to spray as usual. If the season had not been unfavorable for the development of fungous diseases, the growers would have suffered a great loss. As it was, the fruit was almost quite free from fungus and insects, although in some sections a few pear trees suffered with blight. The pear-tree Psylla also made its appearance to quite an extent; in a few orchards the trees were so badly infested that they were noticeable for some distance.

The year has been a favorable one for all engaged in the fruit business in this district; fair crops of clean, well-colored, good-sized apples brought fairly good prices in the orchard. Pickers, packers and coopers received high wages for their services, the only drawback in this business was the scarcity of help and barrels.

The County of Prince Edward has again proved itself as being one of the best apple-producing counties in the Dominion, producing between 200,000 and 300,000 barrels of export apples this season, as well as a large quantity of Damson plums. Some of the growers had from 100 to 400 bushels of plums growing, you might say, wild, in fence corners, and sold from 75 cents to $1 per bushel to the buyers.

There are not many pears growing in the county, but what trees existed were heavily loaded, especially Flemish Beauty, which were particularly fine, and sold for good prices. There are also large quantities of small fruits grown, most of which are sold to canning factories and local markets at fair prices.

In the Counties of Hastings, Lennox and Addington, apples have not been grown to any great extent till within the last ten or fifteen years, when large orchards have been planted, principally in the townships lying along the water fronts. Many have fruited well this year.

The apple growers in this district find the fruit houses a decided advantage to them for storing their fruit, particularly the cold storage in Trenton, where the fruit is cooled down and held at a low temperature for but a trifle more cost than ordinary storage.

Several orchard meetings were held in the early part of the season, and were fairly well attended by growers eager for information on fruit growing.

Elmer Lick gave a practical talk on spraying and pruning, which was very much appreciated, also F. J. Barber, on the advantage of thinning fruit.

Division No. 5.—Wm. Rickard, Newcastle.

As Director for Division No. 5, I beg to report that the local Fruit Growers' Associations formerly organized at Bowmanville, Newcastle and Orono, in Durham County, have not been active or in good working order during the past year. For a time there was considerable interest taken, especially by the membership in Bowmanville, where a number of interesting and profitable metings were held. Among other things that received prominence was that of building a cold storage fruit house, but up to the present no definite action has been taken along this line.

In speaking of fruit culture in Northumberland and Durham, I might properly confine myself mainly to apples. There are a few who have to a limited extent gone into growing pears and plums and small fruits, with some measure of success, but the king of all fruits, the apple, has been and is now receiving by far the greater part of the attention and work of the fruit growers of those united counties, and in my opinion very properly so; for when we consider that the townships bordering on the north shore of Lake Ontario possess the natural conditions of soil and climate for the growing of apples, that cannot be surpassed on the North American Continent, and when we further consider the almost unlimited prospective markets for this inestimable health-giving fruit, both in the east across the great Atlantic to the teeming millions of Europe, and also in our great and glorious West (I say our glorious West, for it is ours, the heritage of our forefathers), in the near future destined to be the home of many millions of well-to-do people, surprising the world in the production of the greatest of cereals —wheat—making them prosperous to such a degree, that, while generally speaking they will not be able to grow fruit, they will have the purchasing power to buy—we say that as near as we are able to look into the future the prospects for growing apples in this favored district along the north shore of Lake Ontario are, to say the least, fairly good, and a considerable number of our most intelligent and progressive landowners are acting on this outlook and planting quite largely young orchards of apple trees of very considerable extent. As an illustration, I may say we find in the second concession of the Township of Clarke, in less than one and a half miles square, some two hundred acres in apple orchards, three-fourths of which may be said to be young orchards, some of them just coming into bearing. As an example of the success that can be made in apple growing here by giving it careful, intelligent management, let me say that I picked and packed this season from thirty-five Ben Davis trees just ten years planted one hundred barrels of apples.

Notwithstanding the above facts, there is, I am somewhat sorry to say, another side to the question of apple growing in this district. Some of our farmers having orchards are disposed to neglect them, allowing the trees to take their chances. If the orchard receives any attention at all it is after everything else is done. The inevitable result is that we have too much poor fruit, and not enough of real good fruit, and herein lies the success or failure in the growing and marketing of apples. No better work can be done than to educate every man having an orchard up to a careful, intelligent management of the same. This will result in success, while neglect and inattention will result in failure; and this will apply not only to the individual, but to a certain extent to the great and important apple business of this country.

The apple crop in this section for the present year has been very abundant and of excellent quality. As near as I am able to ascertain the shipments at the various railway stations up to the present time considerably exceed anything heretofore, except, possibly, in 1896, the year with a bumper crop. Summing up the shipments this season, together with what is in store, I believe I am safe in saying that Northumberland and Durham have produced 300,000 barrels. But this great and important industry in this county is only in its infancy; in a few years from now it bids fair to double and treble in this favored locality, the fruit Townships of Northumberland and Durham.

I would suggest that in another year at our Farmers' Institute meetings the culture of fruit be thoroughly dealt with, in giving the fullest instructions in regard to handling fruit, more especially the apple.

Division No. 6.—Elmer Lick, Oshawa.

In making this report, I think that the most important statement that can be made is that Division No. 6 has never produced as much fruit of as great value in any previous year. The apple crop, the greatest staple fruit in most of this division, was large, and exceedingly fine in quality. The abundant rainfall of the past three years gave the trees vigor, the favorable weather during blossoming favored fertilization, the conditions favorable to the development of scab did not exist to any great extent. The insect pests were not serious, and to finish up with the weather during the picking and packing season was the best since 1892.

Even with all these favorable conditions, and none of them could be better, thousands of barrels of the finest apples have been wasted. Several reasons have led to this: first, the scarcity of labor and its high price; second, the greatest difficulty on record in securing barrels. The apple packers, in order to secure help, have had to pay up to 20 cents per hour for picking and packing, and in order to secure barrels have paid up to 75 cents.

The cost of picking, packing and barreling has been exceptionally high, averaging somewhere about $1 per barrel, in many cases even more. Under the usual conditions of heavy shipments week by week, the price in the English market would have fallen to such an extent that the apples would have scarcely paid for picking. If the English fruit crop had been heavy, the larger portion of the apples in our section might have better stayed on the trees. Nevertheless, the fact remains that apples of standard varieties, picked, packed and shipped in most careful and economical way, have netted from $1.25 to $1.50 per barrel for the apples on the tree. This, of course, is only where barrels were stored at 35 cents, and where picking and packing went on at the same time.

Many sections sent complaints that there was no dealer buying there. Careful enquiry has shown that in such cases orchards were small, varieties numerous, consequently cost of packing high, and very great difficulty in securing cars of two or three varieties at one time. If the small orchardist is to get highest price for his apples, there must be more co-operation, either between the producers or between the producer and dealer. Barrels must be stored early and in a clean place; producers must take more responsibility in regard to picking, packing and drawing to market.

In some parts of the district plums were scarcely worth packing. In common with other sections, large quantities of plums were allowed to rot for want of a market. Yet we believe that if the producer could have known where to send them that fair prices could have been obtained. The distribution of our fruit crop is of vital importance

Division No. 7.—M. Pettit, Winona.

There has never been in Division No. 7 such an immense crop of fruit. Small fruits were good. Peaches a heavy crop, but not enough thinning done and too many small peaches grow.

Fully one-half of the plum crop was not marketed on account of the low price and the rot. During showery weather it is impossible to control the rot by spraying with Bordeaux Mixture. Growers begin to realize that too many plum orchards have been planted.

Grapes were a lighter crop than usual, but the quality was good and prices were very satisfactory.

Pears were exceptionally fine and free from fungus. Blight has been very destructive, and many trees have been entirely destroyed. Close cutting out as fast as it appeared did not prevent it from spreading. Clapp's Favorite and Bartlett suffered the most. Keiffer, which could be most easily spared, suffered the least. This season convinces us that too many Keiffer orchards have been planted. Shipments to Great Britain have not sold nearly as well as previous yeares, and canning factories here have not have been able to hnad'e this season's crop with not one-fourth of the trees planted in full bearing. Many of them will be grafted with better kinds.

Apples have been a full crop, and sprayed orchards have been far the most profitable.

Taking the season as a whole, fruit growers have had a profitable year.

Division No. 8.—E. Morris, Fonthill.

I have to report that the fruit crop of this season has been the most abundant of any year in the history of the Niagara District. Following a large crop the past year.

under ordinary conditions we should have expected only a moderate yield of the large fruits, but owing to freedom from storms during May all blossoms developed fruit, particularly plums, peaches and cherries, the former being more than the market could take, and in view of another such glut I would like to draw the attention of the Society to the fact that there are thousands of tons of plums being shipped annually from Germany and other European countries to England in the form of pulp to be manufactured into jam. I would suggest that steps be taken to ask for a grant from the Government to experiment on this line.

Peaches sold at a very low price, but being such a large crop proved fairly remunerative to the grower.

Cherries were also a large crop, and sold proportionately higher in the market than any other fruit.

Pears were a medium crop and prices fair.

Apples were above the average crop, and usually free from scab and other fungous diseases. They proved a very profitable crop, and added considerably to the bank account of farmers.

All small fruits were the greatest crop known. Although there was great loss from too much rain during picking season of strawberries and raspberries, the market took all at good prices, the Township of Pelham easily leading in quantity of small fruits grown, one grower, Mr. Albert Railton, having shipped 375 tons, realizing a net profit of $3,000.

I recommended last year that we should have some orchard meetings in the central and southern portion of the Niagara District. There has never been a meeting of that kind held in the section, and yet there is no section in Ontario where such meetings are more needed or where the people would appreciate them more. I therefore request that meetings be held in that section.

Division No. 9.—J. S. Scarff, Woodstock.

The year which has just closed has not been quite as favorable for the fruit growers in this district as was anticipated in the early part of the spring. The season opened with great promise of a very large crop of fruit, and just about the time the buds were bursting, on came a cold wave with heavy rains, lasting for several days. This, no doubt, was the cause for the light set of the apples. Notwithstanding this, the apple crop was a fairly good one. In many places the quality was very good, and in some places very poor, being very scabby. Northern Spy, a good sample and a good crop; Greenings, rather light crop; Baldwins, also good. Owing to the very great scarcity of barrels and boxes, a large quantity of the apples were not picked for marketing, but left on the trees and ground to rot.

The pear crop was a little under the average, and in many places badly affected with scab, Keiffer, and Bartlett being badly injured.

Plums, a very heavy crop, but rotted badly.

Cherries were a light crop. The buds in the spring failed to come out well; the quality very good.

Raspberries did well, and were a heavy crop; also the blackberries.

Peaches were not so good as last year.

With regard to our local Horticultural Society in the City of Woodstock, it is doing good work, continuing on the same lines as last year in distributing shrubs, plants, trees and bulbs to its members, also to the scholars of the public schools. During the year the Society distributed to the members 90 Hydrangeas (Paniculata Grandiflora) as premiums from the Fruit Growers Association, and from the local Society 185 rose bushes, 32 peach trees, 33 cherries, 66 currant bushes, 575 gladious bulbs, 100 cannas, 46 caladiums, and 2,826 tulip bulbs, and to the scholars of the schools 300 geraniums, and 64 boxes of annuals, also tulip bulbs to the children, who made an exhibit of flowers at the fall exhibition of the Horticultural Society.

The Society continues to hold regular monthly meetings, and some very interesting papers were read at some of these meetings from the members.

The visit we had in April from Mr. T. H. Race, of Mitchell, who was sent by this Association, was very much appreciated by those that heard him. Mr. Race's address was on "Roses and Their Culture," and was of unusual interest to the large number who turned out to hear him, and was characterized as the best lecture on horticulture the Society had ever listened to.

Division No. 11.—T. H. Race, Mitchell.

The only work worthy of notice done in this district during the year just passed has been in connection with the Horticultural Societies. There has been very little orchard planting done, not enough, in my opinion, in view of what the near future promises in the way of a demand for good fruit. Generally speaking, there has been but little spraying done, and a few varieties of apples subject to spot have been badly disfigured. On the whole, there has been a fair crop of winter apples, especially Spys, and they have been comparatively clean and well developed. It is gratifying to note that a respect for the Fruit Marks Act is becoming more and more manifest, and its requirements have been pretty well observed this fall. But while the farmers are accepting the Act and approving its aims and purposes, they are, with few exceptions, not applying themselves to the requirements of their orchards to turn the Act to good account. Those few exceptions, however, when the orchard has been properly cared for, are sure in time to exemplify the influences of the school master in the community. A few farmers I know of have made their orchards pay this fall, and their example and experience must gradually work upon their neighbors. If not, then our labor is all in vain.

In horticultural work the success of the London Society has been most marked. At the Western Fall Fair in that city in September, the special floral display made by that Society was one of the greatest attractions. in the horticultural building. All the annuals shown in that splendid exhibit were grown from seed distributed by the Society, and the flowers were contributed by the members gratuitously. The general admiration of the public seemed to be a sufficient reward for the labor expended.

In the City of Stratford they have also a live and active Society, which, I regret to say, is not in affiliation with us. They are doing excellent work in giving prizes for the best kept lawn and the best flower and vegetable garden. In the latter end of August they held a flower show in the City Hall, which was a splendid success, and left them a considerable surplus in cash after paying prizes and all expenses.

In our own town, Mitchell, we have a Society with a membership of about one hundred. Of course, I consider it the best and most enthusiastic in the Province. Any meeting held under its auspices is sure of a crowded house. Last spring we distributed nearly thirty dollars' worth of plants and gladiolus bulbs, and this fall about sixty dollars' worth of Parrot tulips and mixed hyacinths. The work is showing itself very conspicuously throughout the town, in the school grounds, church grounds, public grounds, and especially about the homes. The infection, in fact, is being caught by many of the farmers, and the results are telling in the surroundings of many of the best farm homes.

Discussion.

Mr. Morris: I should like to endorse what Mr. Race has said with regard to inducing the planting of more of such stock as he speaks of—tulips, etc. Very few know how cheaply they can be got when obtained in quantities—less than $1 per hundred.

Mr. Race: Yes, 70 cents.

Mr. Morris: They make a greater show for the money and would create a greater interest in horticultural work than anything the Societies could do.

Division No. 12.—J. L. Hilborn, Leamington.

In the district which I represent there are a number of Horticultural Societies, and they are doing good work, but there is not as much interest manifested in them as there should be. The greatest difficulty appears to be that many fruit growers and horticulturists are not sufficiently alive to advantages to be gained by diligently attending meetings and co-operating for the advancement of our calling.

One of the most important meetings held in this district was called at Kingsville in March for the purpose of discussing transportation grievances. There was a large gathering of fruit shippers. M. K. Cowan, M.P., occupied the chair, and displayed considerable interest in the welfare of the shippers. The express companies were represented by their route agents, also by Mr. Sparling, Superintendent of the Canadian Company. As a result of this meeting we got a much better service this season, but undoubtedly the express rate on fruit is more than it should be, especially to certain points.

The Mersea Agricultural Society hold their fall fair at Leamington, and manifest considerable interest in the fruit department, and annually have a fine display of fruits, in which much interest is taken, and considerable information is gained by the different exhibitors and the public generally in regard to the best varieties to grow and in the proper naming of odd and new varieties. I have for several years assisted in the judging of this department, and correcting names where wrong.

The fruit crop of 1903 was a bountiful one, but prices as a rule were rather low.

Strawberries were an immense crop, especially in Lambton County. Plums were a great crop everywhere, and so cheap that some of them were never gathered, as there seemed to be no sale for them. It appears to me that there should be sale for so good a fruit as the plum if properly canned or jammed and put upon the proper market. Perhaps there is room for the O.F.G.A. to do some good work along the line of investigating this matter, and encourage canners to handle more plums when they become so cheap, and thereby prevent a total glut in our markets.

Peaches as a rule were a heavy crop, the exception being when varieties that are susceptible to the curl leaf were not properly sprayed, and Crawford varieties that were growing on soils too sandy to be well adapted for them.

Owing to so much rainy weather during the ripening period of peaches and plums there was considerable waste from rot. The flavor and keeping qualities of peaches especially were much affected by the same cause.

Apples yielded well, but the fruit was much affected by the ravages of the scab and Codling moth. There should be much more attention given to the spraying of our apple orchards.

Much good work is being done by the Farmers' Institute in the way of impressing growers with the importance of more thorough pruning and spraying of their orchards, but there still remains room for much missionary work along those lines.

Division No. 13—G. C. Caston, Craighurst.

In the district comprising this division the present year has been a favorable one for most varieties of fruits. Strawberries, though somewhat injured by the drought, were a fairly good crop. Raspberries, though not so good as in 1902, were yet an average crop. The blackberry has not been grown commercially in our district. With the exception of my own plantation I know of none being grown in a commercial way. And the reason is not far to seek. Nursery agents have been selling varieties that were not suited to the climatic conditions of the district. They would grow well in summer, but would lose nearly all the bearing wood during the winter, and consequently this fruit has been neglected. After a trial of some twenty varieties, I have found two that exactly suit our conditions, the Eldorado and Agawam, both of good size and quality, and producing magnificent crops, so that I have found the blackberry to be one of the most profitable of the small fruits.

Cherries were next thing to a failure this year, and plums, though plentiful and correspondingly cheap in the district near and around the Georgian Bay, were further inland only a very moderate yield. Pears, which are not extensively grown as yet, were very good in quality.

Apples were good in both quantity and quality. That universal favorite, the Northern Spy, was more than usually prolific this year, and the quality was very fine. One mistake that has been made in our district is the planting of too many fall apples and of too many varieties. Realizing this, planters are now confining their planting to winter varieties only, and only a few varieties of these. Some, acting on advice from experienced growers are taking the better plan of planting Talman Sweets and other hardy sorts for the purpose of grafting them with the best winter sorts for commercial purpose, the chief of which is the Spy.

An increased interest is being taken in the growing of orchard fruits. As an instance of this I may say that the Board of Trade of the town of Orillia asked the Department of Agriculture to send some one to investigate the capabilities of that immediate locality for the production of commercial apples. As a result of this action Messrs. Creelman and McNeill were sent to that locality in the early part of the summer, and I believe their investigation proved that the best commercial varieties can be grown successfully there, more especially by the system of top grafting on hardy stock. My district is a very large one, reaching from Lake Simcoe to the Lake of the Woods. It is larger than all the others put together, and I am pleased to say that apples are being grown away north in that District of Algoma where it was not thought possible a few years ago.

In St. Joseph's and Manitoulin Islands, and in several places on the northern shore of Lake Huron, and even on Lake Superior, some of the hardy sorts are being grown, and I believe that there is a strip of country reaching the whole length of the north shore of Lake Huron to Garden River a few miles wide that will grow a great many of the varieties that we are growing in the more southerly sections. As the result of a meeting held in Toronto of the Board of Control and experimentalists, a move has been made toward having some experiments in fruit growing conducted in New Ontario, chiefly in the Temiscamingue country. I attended a number of orchard meetings in our district in company with Mr. McNeill in April. These, where properly advertised, were well attended, and an interest manifested that will, I hope, lead to some practical and profitable results. Mr. McNeill explained very fully at each meeting the commercial side of fruit growing, and we quite hope that co-operative marketing will be one of the features of the future industry in our section.

FRUIT NOTES.

By C. L. Stephens, Orillia.

Although not having any official connection with your Society requiring that I make a report thereto, yet because of the very great interest which I take in the work carried on by the Association, and by virtue of my connection with the Horticultural Society of this town, I crave the liberty of hoping that what I have to say about fruit-growing in this district may be of some interest to your meeting. I, therefore, give a brief sketch of my experiences in fruit matters during the past years:—Early in the spring we were favored with a visit from Mr. A. McNeill, Vice-President, and Mr. G. C. Caston ex-President, who held orchard meetings at several places in the district, and their lectures and practical illustrations in pruning, etc., proved most acceptable. Later on Mr. T. H. Race, by invitation of the Horticultural Society, visited us, and an evening meeting was held for him at the residence of Mayor McCosh. Mr. and Mrs. McCosh placed their commodious reception rooms entirely at our disposal, and were most kind in promoting the success of the meeting Mr. Race was "himself," and spoke most instructively and entertainingly for nearly two hours, and the discussion which ensued showed that he had enlisted the sympathy of his hearers in the cause of civic improvements. It was regretted that many other attractions on the same night caused rather a small audience for Mr. Race, but amongst the ladies and gentlemen present were some of the most progressive and thoughtful of our citizens. Our local Board of Trade has during the last year developed an interest in the apple growing industry, and on their invitation your Vice-President and Secretary visited the district about blossoming time, spending nearly a week here, and in company with myself or some other member of the Board of Trade visited, by pre-arrangement, many of the orchards within ten or twelve miles of the town. A close arrangement was made as to the different varieties of apples grown, the condition and hardiness of the trees, etc. A number of neighboring fruit growers were always assembled. All were glad to talk of apples, and the prospects of growing them on a commercial scale, with profit to themselves, and with the effect of broadening the vision of the visitors as to the area in which first-class commercial apples may be grown. Towards the end of September Mr. McNeill and myself spent another day amongst the orchards and saw the fruition of the hopes of spring; and I think Mr. McNeill was entirely confirmed in the favorable opinion his spring experience had given him. He has promised a report on the subject, which will be of much interest to the fruit growers up here. Mr. T. H. Race was at our Fall Fair on Sept. 1 th. as judge of fruits. The exhibit was large and very fine, and I think Mr. Race was duly impressed; although, owing to the early season of the year, the apples had not then attained to nearly their full size and color. I am sending, to help the exhibit at your meetings, a case of winter apples, which cover nearly all the varieties at present grown here, and which represent the average size and general appearance of these apples as we grow them; not selected for extra size, but just average. During the past month I visited a good many orchards in this "Orillia District," and from observation have formed the opinion that all of the more valuable winter apples can be grown here, if not as procured from the nursery yet by top-grafting upon hardier stock Thus I have seen heavy crops of very fine "Kings" grown upon "Duchess" stock, and so far as I observed upon "Duchess," only. This, I think, is following out a suggestion thrown out by Mr. Caston at your annual meeting in this town some years ago. This has been so far successful, but I think some equally hardy stock, with a more vigorous growth would be better, as I find the "King" top has a tendency to outgrow the less vigorous stock. Indeed, in one orchard I found, chiefly from this cause, and a heavy load of fruit, fine trees had been completely broken down and destroyed; and had I not been careful to tie up the laden branches, my "King" or "Duchess" would have met a similar fate. I found that nearly every orchard had from one to a dozen or so "Northern Spy" trees growing on their own stock and doing well, some of them as much as thirty years old. Several farmers claimed to have "Baldwins" and "R. I. Greenings," but I found none of the former, and but one tree of the latter, and it was doing well and had a good crop of fine fruit. It might be well, notwithstanding, to recommend the top grafting of Spy, Baldwin, and R. I. Greening, as well as King, on some hardy, robust stock, the Talman Sweet would, I presume, answer the purpose well. Just here I might say that the farmers about here have great and just cause to complain of the manner in which they have been treated by nurserymen or their agents, or both; against the agents for recommending varieties that will not grow, or if grown are of no value, and against the nurserymen for not sending trees according to name or order. By these means, I have no hesitation in saying that the farmers of this district have been defrauded of thousands of dollars, and the country now is filled up with a lot of utter trash in the shape of apple trees, thus foisted upon the farming community. Twenty years ago, I was fooled in this way myself, and I find the trouble still going on every year, young trees coming into bearing showing worthless fruit; for instance, a neighbor asked me this fall to take a look at half a dozen young "stocks," which were bearing their first apples, and, as he said, doing finely; it needed but a glance to assure me that his "fine stocks" were but worthless Haas; and so on. I could tell many similar tales. Now, sir, is not this a question which your Society might well consider and deal with in some effectual manner, so as to prevent this continual cheating of the farmer by the nurserymen. I do not mean to infer that all nurserymen carry on these disreputable practices, because I know, and everyone knows, that some of our nurserymen, and even their agents, are honorable in all their dealings. I find most of these mistakes (?) to occur with trees coming from the United States. To carry on many businesses and professions in which the well-being and comfort and, I might say, well-doing, of the community is at stake, a license is necessary. I think a license to sell fruit trees might fairly be a condition required for anyone engaging in the business. I was present at the Bracebridge Fall Fair and there, again, I found a very fine exhibit of apples, including Duchess, Wealthy, Ben Davis, several Russets, also some of the Russian Apples, and crabs in great variety. There were also several seedlings, some of which were doubtless of local value. The apple crop of Southern Muskoka is yearly increasing in volume and value, and whatever success has been attained in the matter is largely due to the efforts of Mr. J. P. Cockburn, of Gravenhurst, who has been for many years engaged in experimenting with named apples and seedlings, and has freely given of his experience for the benefit of his neighbors; I had the pleasure of meeting Mr. Cockburn for a few minutes when passing through Gravenhurst.

I am afraid my brief remarks have spun out to rather "a length," but it's just a case of a man's pen running away with his sense of propriety. In conclusion, I regret very much that I am unable to be present at your meeting, but hope that if you meet in Toronto next year I shall be with you.

REPORT OF MR. THOS. BEALL, LINDSAY, HON. DIRECTOR.

I have the honor to submit herewith a brief report of some of the circumstances relating to the fruit industry in this northern portion of Division No. 5, and may be considered as supplementary to Mr. Rickard's able report, which refers principally to the southern part of this Division.

The success or non-success of horticulturists,—after exercising intelligently all the skill they possess,—depends largely on the climatic conditions prevailing in their locality, especially during the six months from the middle of April to the middle of October: The variableness of the weather of the past season in this northern section of the district has made greater demands upon their store of knowledge and upon their skill in protecting their crops in changeable weather, than perhaps during any previous season for a generation.

For about ten days before the middle of April the weather has been warmer and drier than usual, consequently the soil was at that time in fine condition for working and most persons in this locality got in their early vegetable seeds a week or ten days earlier than usual. Much farm and orchard work was also done before the end of the month. The weather during all that time continued warm and mostly dry. The total depth of rain which fell from the 6th to the 30th of April being only .53 inches, and the max. temperature on this last of April 76.6 degrees. In the evening, however, of that day a great change took place, and as much rain fell in a few hours as had fallen altogether during the previous twenty-four warm, beautiful days. On the following morning, May 1st, the temperature had fallen to six-and-a-half degrees below the freezing point and on the next morning a half a degree lower.

On Monday morning, May 4th, what a change had come in the prospects of the horticulturists here! On the previous Thursday a few of the earlier strawberry plants were in bloom. The blossom on currant and gooseberry bushes were falling and the young berries partially set. Raspberries looked beautiful. Plums also gave great promise, and the prospect for a bountiful supply of apples and pears had never been better. But now: the strawberry crop is injured to some extent. Currants and gooseberries more or less formed, are, to the extent of one-half of the crop on the ground. Raspberry bushes stand with bowed heads, there will be but little fruit, perhaps none. Plums will certainly be a total failure. Grapes, when uncovered, will be greatly injured. My own are covered, and are safe for the present. The quantity of apples and pears will be greatly diminished, especially the earlier varieties.

Such was the fruit prospect at the beginning of May. We now find that the severity of the weather at that time may well be described as a "blessing in disguise." A few only of the earlier varieties of strawberries were injured, and most of our growers never had a better crop. Currants and gooseberries were about one-quarter of a crop. Raspberries less than one-tenth. Plums a total failure. Grapes, an average crop when covered. Apples and pears are an excellent crop, and the cleanest produced in this locality for many years. There is but little spraying done here, yet this season there is scarcely any loss occasioned by insect pests of any kind, and the loss by scab, although great, has been but little as compared with former seasons.

The value of the fruit crop as a whole in this northern portion of Division No. 5 is much greater than for any season heretofore; and I have no doubt but the severe frost on the 1st and 2nd of May was the chief factor in producing this result. The very long cool summer with the unusually late "first frost," which occurred on 24th October, was also probably contributory.

COMMITTEE ON RESOLUTIONS.

On the motion of A. McNeill, seconded by M. Pettit, Messrs. Tweedle, Hilborn, Thompson, Peart, and McNeill were appointed a Committee on Resolutions.

NOMINATING COMMITTEE.

The Nominating Committee was appointed by the President as follows: Messrs. Caston, Jones, and by the meeting, Messrs. Lick, Race, and M. Pettit.

COMMITTEE ON FRUIT EXHIBIT.

Messrs. W. T. Macoun, Professor Hutt, and L. B. Rice, Michigan.

Mr. Creelman moved, seconded by Mr. Scarff, that rule 24 of the Constitution be suspended so as to permit the Committee on Nominations to report immediately after dinner. Carried.

REPORT OF NOMINATING COMMITTEE.

The report of the Nominating Committee was adopted, with slight amendments. See page 4.

DIRECTORS' MEETING.

The newly-elected Board of Directors met at the close of the evening meeting on Wednesday, Nov. 25, all members being present.

The President, W. H. Bunting, on taking the chair, suggested that W. A. MacKinnon, Chief of the Fruit Division at Ottawa, be made an honorary director, as his advice and assistance from a commercial point of view was likely to be valuable to the Board.

Some discussion ensued as to the power of the Association to add to the number of its Directors under the Act. The conclusion reached was that, while Hon. Directors might properly be appointed by the Board, they would not be entitled to vote on matters involving the expenditure of the funds of the Association.

T. H. Race moved, seconded by Wm. Rickard, that W. A. MacKinnon be made an honorary director in an advisory capacity. Carried.

A. McNeill moved, seconded by G. C. Caston, that G. C. Creelman be reappointed Secretary of the Association at a salary of $500 per annum. Carried.

Messrs. Thos. Beall, Lindsay ; A. M. Smith, St. Catharines ; W. T. Macoun, Ottawa, were reappointed Honorary Directors of the Association.

Some discussion took place as to the practicability of making the appointment of honorary directors permanent instead of re-electing same from year to year, and the Secretary pointed out that there was nothing to prevent their being elected during good conduct, whereupon it was resolved, on motion of Mr. McNeill, seconded by Mr. Whyte, that the appointment of honorary directors should be considered permanent.

Annual Meeting for 1904.

The Secretary read the following letter from the President of the Toronto Horticultural Society, inviting the Association to meet in Toronto in 1904 :

Toronto, November 21st, 1903.

To the Directors of the Ontario Fruit Growers' Association, in Convention at Leamington :

Dear Sirs,—On behalf of the Toronto Horticultural Association, I beg leave to invite you to hold the next annual meeting of your Association in the City of Toronto.

Toronto has for some time been known as the "Convention City." The hotel accommodation, the easy access from place to place, the central location of the city and the ease with which it is reached from all other parts of the Province, make it a desirable place for delegates to meet together.

It is also the custom of the Toronto Horticultural Society to hold a flower show about the time of your annual meeting, and it is possible that we could co-operate with you to our mutual advantage.

In speaking for the officers and members of the Toronto Horticultural Society, I might say that we would do all in our power to make your annual meeting a success, and trust that when the time comes you will see fit to bring your convention to the "Queen City."

Yours very truly,

Sgd. Edward Tyrrell,

President.

The Secretary further stated that he had received a telegram from the Mayor of the City of Toronto as follows :

"On behalf of the City of Toronto, I extend a hearty invitation to the Ontario Fruit Growers' Association to hold their next annual meeting in Toronto."

Sgd "Thomas Urquhart,

Mayor."

In presenting the matter, the Secretary said that the holding of the meeting in Toronto would give the Association an opportunity to co-operate with the Toronto Horticultural Society, which held an important floral exhibition at that season of the year. This would be an interesting feature to delegates from Horticultural Societies, and should stimulate their attendance. He suggested that the Association should co-operate with the Toronto Horticultural Society and also make a large display of winter apples, securing a hall of sufficient size for the purpose. This, he thought, might be developed into a sort of Winter Fruit Fair, and that some assistance might be obtained from the Government towards this object.

E. Morris: The best meetings of the Association have always been held in Hamilton, and it seems to me that that would be a more central place for the great fruit section.

A. McNeill suggested that an exhibit of orchard implements should be added to what had already been suggested. Mr. Caston favored holding the convention in Toronto.

On motion of Harold Jones, seconded by Murray Pettit, it was decided that the next annual meeting should be held in the city of Toronto.

In regard to a Winter Fruit Fair, it was suggested by Mr. Caston that the matter be left with the Executive, and on the motion of Mr. Race, seconded by Mr. Caston, it was decided to leave it to the Executive to formulate some scheme and to make an estimate of the cost and submit it to the directors by circular, so that a decision might be reached at the time of the Toronto Industrial.

The President: Inasmuch as the Report of the Executive referred to a change of policy in reference to the Horticulturist, I would suggest that the Secretary read that portion of the Report.

The Secretary read the portion of the report referred to.

The President: In addition to what the Secretary has stated, I may say that it has appeared to me for some time back that it is very desirable, in fact, absolutely necessary, that our magazine should be placed upon a paying basis. This apparently has not been the case in past years. The grant we have received from the Department has to a very large extent been absorbed in the publication of our magazine, and in consequence we have to a large extent been cramped for funds to conduct the affairs of the Association. I understand that some three years ago representations were made to the Department, in view of this fact, and an increased grant asked for. The Minister did not see his way clear to accede to the wishes of the Board under the circumstances, and no increase was made. It is for you to consider whether anything can be done to put the magazine on a profitable financial basis.

Mr. Race: It would appear from the financial statement that the Horticulturist has been paying its way, judging from the amount received in membership fees.

The Secretary: That does not include a number of items given below for illustrations, etc.

The President: Nor the salary of the editor; the first item is simply the cost of publication

Elmer Lick: There has been a decided improvement in the paper, and if it is possible to make it still more attractive, the sooner it is done the better.

Harold Jones: It would be of value if Mr. Owen's address and discussion could be published in the Horticulturist at no distant date.

The Secretary stated that he had met with great difficulty in securing advertisements for the magazine in its present form. It was too much of a parlor magazine. It should, he thought, take a more up-to-date form, and the size should be increased, so as to admit of a great deal of valuable material, which came to his office from time to time, being published. "At its last annual meeting, the Canadian Press Association discussed what the weekly papers could do for agriculture, and I suggested that my office could supply them with a great deal of material that might be used in that way. They accordingly proposed to the Minister of Agriculture that someone should be placed in the office who could undertake this work. We now have a suitable man in view, and the Minister would doubtless allow us to use part of his services in connection with the Horticulturist. I am willing as Secretary to undertake to make these improvements, knowing that the responsibility will, to a large extent, fall upon me, if you will give the Executive power to make such changes as they may see fit in the Horticulturist."

L. Woolverton: I want to support what Mr. Creelman has said. I think he has spoken in the right direction. I know that it is very hard to get advertising patronage, and believe that papers published in large centres of population always appeal to the advertiser more than a journal that is issued in a small place. I think on that account it might be wiser to publish it in Toronto rather than in Hamilton. I think that if Mr. Creelman's ideas were carried out, and the business management put into the hands of someone who was working in that direction all the time, enough money could be made to make the journal pay for itself, including the salary of the man who is to be employed upon it.

After some further discussion as to the style and size of the magazine, it was moved by Mr. Caston, seconded by Mr. Hilborn, that the matter be left with the Executive, with power to do what they thought best, with the view of improving the journal. Carried.

W. T. Macoun suggested that the Horticulturist should unite with the journal issued by the Dominion Forestry Association, and the Secretary read a letter he had received in that connection from the Forestry Association, as follows:

Ottawa, Nov. 23, 1903.

Dear Sir,—I beg to acknowledge the receipt of your letter of the 21st instant, in which you suggest the idea of our making some arrangement with the Fruit Growers' Association to have a joint publication for the two Associations. In reply I beg to say that this matter would have to be considered by the Board of Directors of our Association before anything could be done, and as it would be impossible to have a meeting before your Leamington meeting, I am unable to say anything with reference to the proposal. In any case, I do not think that it would be possible to make an arrangement to commence at the beginning of the year. We have been considering the idea of publishing a quarterly periodical, and this was discussed at a meeting of the Directors held last week, but so far the matter has been referred to the annual meeting to be held in Toronto in March next. I need not say that the members of the Canadian Forestry Association look upon the Fruit Growers' Association as a kindred society, with which they should exchange views and give mutual assistance as far as possible; and they would be pleased to have representatives from your Association at the annual meeting.

Yours truly,

(Signed) E. STEWART,
Secretary.

New Building and Prize List Committee for the Industrial Exhibition, Toronto.

On the motion of Harold Jones, seconded by A. M. Smith, Messrs. Race, A. McNeill, President W. H. Bunting, and Secretary Creelman were appointed a committee to take up the question of the requirements, specifications, etc., of the new building for Fruit, which it was proposed to erect at the Dominion Industrial Exhibition, Toronto, with the representatives of the Exhibition Association, and also to revise the prize list in regard to fruit.

THE EVENING MEETING.

In the evening a public meeting was held in the Town Hall. W. H. Bunting, President of the Association, occupied the chair, and spoke a few words of welcome. The hall was crowded, among the audience being a great number of ladies. The Leamington orchestra contributed several selections that were much enjoyed. The platform was draped with Union Jacks and Stars and Stripes.

Mayor Lewis Wigle extended the welcome of the town to the delegates. He spoke reminiscently of the olden days in Ontario, and said that the Association could not have held its first meeting 28 years ago in Leamington, because then there was no Leamington, nor were there any railroads to reach the district. He referred at some length to the fruit industry of Ontario, of which the most important district was that extending from Niagara to Essex. Leamington itself was the most southerly town of Ontario, and in his belief and that of his fellow-townsmen, the most favorably situated for fruit-growing.

John Auld, M.P.P., of Amherstburg, welcomed the fruit men on behalf of the county. He explained that the Government were doing much to assist the farmers in fighting pests and express companies. Everyone admitted that Essex was the fruit garden of Canada. There were many other flourishing industries in Essex ; among these he mentioned the oil, wine, tobacco and general farming.

M. K. Cowan, M.P., of Windsor, spoke of the difficulty last summer between the fruit growers of Essex and the express companies. The meeting between the express companies and the growers, held to discuss this matter, had resulted in much good. Fruit had not long been the staple product of this country. Ontario was only a new fruit country. They must do the best they could, and when their product was increased they would be able to demand and exact a cheaper and better express service. Essex was probably the most favored part of Ontario. It was favored as the corn belt, the fruit belt and the tobacco belt. There were more sunshiny days in Essex during the tobacco-growing season than in Kentucky. The farther north you could grow a fruit, moreover, the better it would be, and for this reason Ontario fruits were hardy and of splendid quality.

L. B. Rice, of Port Huron, Mich., a delegate from the Michigan Horticultural Society : J. Elliott, M.A., Principal of the Leamington High School ; G. W. Cady. President of the South Essex Horticultural Society, and J. L Hilborn, President of the Leamington Horticultural Society, added their words of welcome to those of the previous speakers.

W. H. Rickard, M.P.P., of Newcastle, replied to the addresses of welcome, on behalf of the Association. He laid stress upon the necessity for developing the British market for Canadian fruit.

PRESIDENT'S ADDRESS.

By W. H. Bunting, St. Catharines.

I desire first of all to express my appreciation of the honor conferred on me last December in my election to this responsible position, and to tender my hearty thanks to the officers and directors, and more especially to our energetic Secretary-Treasurer, for their hearty co-operation with me in the affairs of the Association during the year.

In reviewing the course of events of the year just closing, I am free to confess, that it would have been quite easy to have entrusted this office to hands far better qualified and more competent than my own to discharge its duties creditably and in a satisfactory manner. However, as I was not responsible for the error in judgment in the selection made, and am not conscious of any culpable neglect of duty, I can now restore the trust without any vain regrets as to wasted opportunities or a wilful disregard of the interests of the Association.

I am very glad to state to you in a general way what has been brought out more fully and in greater detail by the Secretary in his report ; that the year has been one of progress and advancement upon lines of work laid out by the Executive and Directorate of the Association, in connection with the educational Campaign carried on throughout the various fruit-growing districts of the Province.

I trust at this annual meeting some action of importance with reference to the general policy of the Association may be taken that will tend to maintain our position in the front rank of the Agricultural interests of this magnificent heritage of ours, the Province of Ontario.

In the years that have gone by, it has been customary in this address at times to indulge in some reminiscences regarding the early struggles and triumphs of the Association. We are approaching the half-century mark of our existence as an Association, and have passed the quarter-century mark in the history of our magazine, and I believe that I am right in stating that there is only one gentleman, who is with us to-night, that can claim to have taken an active part in the organization of this Association away back in the early sixties. I refer to our respected friend and enthusiastic horticulturist, Honorary Director A. M. Smith.

While our Association has had its vicissitudes and its struggles, its progress has been ever onward and upward, and it has stood during all these years for whatever was for the greatest good of the fruit--grower, whether his acres be many, or only the modest town lot, and throughout our broad Dominion there is not a tiller of the soil, there is not an artisan or mechanic, there is not a merchant or manufacturer, there is not a single individual, no matter what his position in life, but to a greater or less extent, is under obligation to this Association for much that adds to the beauty of his home surroundings and to the comfort and health of his family life. The immense strides that have been made in the beautifying of town and country places, and in the vast increase in the production of the many and varied fruits, throughout this country, are largely due to the earnest men and women who have been connected with this Association, and who have drawn inspiration from the annual meetings held in the various parts of the Province from time to time, and who have gathered knowledge from a perusal of the reports of the addresses delivered at these meetings, from the work of our experimenters, and last, but not least, from the columns of the Canadian Horticulturist, so ably conducted by our editor, Mr. Woolverton.

These facts are, however, known to most of you, and it is quite unnecessary that I should enlarge upon them at this time. Permit me, however, to express the hope that we may not rest on the laurels and traditions of the past, but that, enthused by what has been accomplished by those who have guided our Association so wisely and so well, we may be able to take higher vantage ground in the future, and make our influence felt not only in legislative halls, but also in the councils of the great transportation companies, and with the powerful consolidations of capital that are absorbing so many of the avenues for the disposition of the products of our orchards and vineyards, in such a way as will secure even-handed justice to each and every member of this Association in his business relations with the public.

It will not be out of place here on behalf of the Association to tender to the Minister of Agriculture our appreciation of the kindly interest he and the officials of his Department have continually taken in every movement that has had for its object the advancement of horticulture in this Province, and the substantial manner in which that interest has been manifested from year to year as circumstances have warranted. We believe that we have in the Hon. Mr. Dryden a gentleman who is thoroughly in sympathy with the agriculture of the Province, and who is eminently well qualified for the position which he so ably fills.

Gov. Odell, of the State of New York, observed in his address at Niagara Falls before the Farmers' National Congress a few weeks ago that Government financial assistance to the agricultural interests of the country was not paternalism, but tended to develop and encourage good citizenship in the broadest sense of the term, and was a proper and legitimate use of the public funds. Our Provincial Department of Agriculture has fully realized this principle in the past, and it remains for us to provide proper channels for development and progress and to lay our plans before the Department in a businesslike way, when I have no doubt our requests for further financial aid will receive careful consideration.

During the past year a new horticultural organization has been formed, called the Canadian League for Civic Improvement. While this is a separate and distinct organization, arrangements have been effected whereby this Association is represented on its Board of Management, the Canadian Horticulturist has been selected as the official organ of the League, and a special department has been set aside for its use. We will be glad to welcome their Hon. Field Secretary, Mr. G. R. Pattullo, to this annual meeting, and will no doubt listen with a great deal of pleasure to his address on the aim and work of the League.

The time has come in the history of the Province when a great deal more attention is being paid to the improvement and beautifying of our home surroundings and the public places in our towns and cities than heretofore, and in this good work every member of our Association is called upon to take a part.

We have spent years in learning how to grow good fruit and to produce plenty of it, in securing and disseminating the best and most profitable varieties of all kinds of fruit, and that we have succeeded in so doing goes without saying. Notwithstanding the many and varied obstacles that have stood in the way, and the many unforeseen discouragements that have encompassed the path of the fruit-grower, the past season has again conclusively proven that we are able to produce under ordinary circumstances an abundance of fruit for all the demands of our broad Dominion.

The question of production is not now the one that confronts us, but prompt and efficient distribution to the various parts of the Dominion where needed, at a reasonable cost and in a careful manner. To this problem our Transportation Committee in the past two or three years has given considerable attention and thought. The result of their efforts has been of considerable benefit to the large commercial grower, but not so much to the smaller producer. It is hoped, however, that with the appointment of a Railway Commission, a step that this Association has strongly urged for several years, and through its Transportation Committee forcibly brought to the attention of the Government last winter, that such representations may be made to the Commission as will lead to a very great improvement in the carriage of fruit, both as to rates charged and service rendered, which will result in Ontario fruits going in ever-increasing quantities to the important markets which are opening up in Manitoba and the Northwest, as well as to the more northerly parts of our own Province, to say nothing of the large and important export trade over the sea.

There is perhaps no question of such interest to our members to-day as the great problems of distribution. How to organize and co-operate to accomplish this object is a live and burning question in the minds of hundreds of earnest practical growers at the present time. When, during the past season thousands of baskets of beautiful fruit have been left to hang and rot on the trees, from lack of proper facilities to place them in the hands of those who would gladly have purchased them at a fair price, and when thousands of barrels of apples have also been wasted or disposed of at a fraction of their real value for want of suitable packages, while at the same time a Macedonian cry was heard from the mother country for all the fruit we could possibly send her, it is certainly time for this Association to be up and doing and to endeavor, in some way to elaborate a plan, whereby these unfortunate conditions may not continually recur. I am glad to say that the germs of co-operation have gained a foothold, and a good beginning has been made in some sections. We have also with us to-night a gentleman from our cousins to the south, who has had considerable experience in co-operative organization, and who will no doubt be able to give us much valuable information in this respect.

A word or two with reference to general conditions during the past year. We have cause to congratulate ourselves that we have experienced a year, when the promise of the spring has been abundantly fulfilled in the harvest of the summer months. All kinds of fruit have been produced in abundance and of good quality, and even our standard fruit, the apple, which gave us such a large production in 1902, has surprised us with a generous supply again this year. While prices have in some cases been very low and cost of handling and transporting correspondingly high, still on the whole the average grower has cause to express his gratitude to Him who gives the early and the latter rain, and who brings to perfection the beautiful products of our orchards and gardens.

It has also been fully demonstrated again this year that it is quite possible to cope in a scientific way with the insects and fungous pests that cause the fruit-grower so much annoyance and loss. Our members will do well to inform themselves thoroughly on the best appliances and the most up-to-date methods of dealing with those troubles, and, having gained the information, attend diligently to putting it into practice, a work for which they will be well repaid.

I thank you, ladies and gentlemen, for the hearing you have given me, and I trust that our meeting here in Leamington may not be without its value to the residents of the town and surrounding country, and also may result in great good to fruit-growers generally throughout the Province.

ADDRESS.

By Dr. James Mills, President, O. A. C., Guelph.

Fruit growing is one of the most interesting and ennobling branches of farming. It appeals to educated, refined people. Of the various sections of the farming community in this Province,—and I think I know something about them, the most intelligent and progressive sections, in my judgment, are the fruit-growers and the stock-raisers. I think that would be borne out by evidence that could easily be collected by one visiting the different parts of this Province. I do not see how a man who spends his time growing fruit, or more especially growing flowers, could be a coarse or ignoble man. I think, there is no more honorable or interesting occupation.

Ontario is especially fortunate as a Province in the fact that it can grow a great variety of fruit of most excellent quality. I doubt whether there is any Province or State on this continent that can grow a greater variety of fruit of first-class quality. It is due to this fact, I take it, that we made such an excellent record in Philadelphia and Chicago, and more recently at Buffalo. We stood first at Chicago and second at Buffalo, New York State being first. I think this was due to two things: first, that we can grow a great variety of fruit, and second, that the farther north you can develop anything to perfection, the finer the quality you will have.

It is true that we have many fine orchards in this Province; but any man who travels through the Province and looks right and left, and thinks, will be forced to the conclusion that we ought to have ten orchards where we now have but one. I cannot understand how it is that we have not more first-class orchards, considering the fact that we can grow such excellent fruit, with even moderate care, in almost any part of the Province. How is it that we have not more first-class orchards? If we had more our farmers would be better off.

In conclusion, I wish to call attention to four or five of what I consider the most urgent needs in connection with the business of fruit-growing in this country:

First, attention to the varieties of fruit that our farmers and fruit-growers are spending their time on. The report comes from home and abroad that we have too many varieties of the various classes of fruit. The fruit inspectors at Liverpool are advising the shippers not to send so many varieties, but rather to keep to a few varieties of acknowledged merit. That is what the markets everywhere seem to want. One may, of course, have two or three trees of several varieties for home use; but if he is going to sell his fruit, he should confine his attention to five or six of the best varieties of autumn and winter fruit. I think there is need for a move in that direction.

The second urgent need that I will mention is attention to packages. I was rather surprised to hear your President say in his address that in the matter of providing the right kind of package, we are behind our neighbors across the line. I ask, why? Have we not the industry and intelligence to devise a suitable package? For every fact, there is a cause. The President said there were thousands of barrels of apples that rotted on the trees or were disposed of at a small fraction of their value this year, because of a lack of suitable packages. Is there not sufficient trade in this Province to warrant anybody in manufacturing the right kind of box? or have not the fruit-growers themselves come to any definite conclusion, so as to be able to say exactly what they want? The matter was discussed at your convention last year; and there seemed to be a great difference of opinion. I think it is time you came to a conclusion upon this important matter.

Third, Spraying: There is the greatest need of more attention to spraying. It is difficult, I find, to buy a barrel of Snow apples that are free from scab. I bought two barrels a little while ago, after trying half a dozen places; and three out of four apples in the barrels were badly affected. I give this as an illustration of the seriousness of the trouble. If this Association can only do something to burn the need for proper spraying into the minds of the farmers, it will have done a great good. Much of the spraying is spraying only in name. Spraying has to be done well to accomplish the desired results. If farmers want to make anything out of their orchards, they must do more and better spraying.

Fourth, Transportation: This is the most important matter of all. Mr. Cowan said that the fruit-growers had "been fighting pests and express companies." I was struck with the expression; and I think they will have to fight still more vigorously. If this Association has before it any one question that is of primary importance, it is the question of transportation. If what you say be true,—and you men ought to know,—that one-third to one-half of what you receive for your fruit is taken by the express and railway companies, it is indeed a very serious matter. Surely there are fruit-growers enough in this Province to present the case strongly and clearly to the transportation companies and make them understand that it is necessary that your fruit should be promptly carried, and carried at a reasonable rate. But you have got to wake up on this question. Not long ago I had some experience myself. I bought a basket of fruit in Hamilton, for which I paid thirty cents; and what do you think I paid to have it delivered in Guelph, about 30 miles distant?—35c. The time is at hand when you should say to the Government that you must have reasonable rates from express companies, or have an express department in connection with the postal system of the Dominion. I have felt for some years that we ought to add a parcel department to our postal system. (Applause.)

This matter of transportation is one that you should call upon your representatives in Parliament to take up. The railway companies have enormous power; but every man sent to Ottawa has a power also, and should make himself felt; and personally I feel that I cannot impress upon you too strongly the necessity to deal promptly and directly with your representatives in Parliament. Compel them to take up the matter; and let them feel that they have the people behind them in their demands.

THE CANADIAN LEAGUE FOR CIVIC IMPROVEMENT— ITS PLANS AND PURPOSES.

By the Hon. Field Secretary, Major George R. Pattullo, of Burnside, Woodstock.

Civic improvement is a natural sequence and complement of educational material and municipal growth. The first public duty of our Canadian forefathers, a century ago, was to establish Municipal Institutes. These were essential to provide the common public necessities of pioneer life. The community must be organized. It was not enough that the settler should slash down a "clearing" for himself in the "Queen's Bush": that he should build thereon a log house to shelter his family, and erect a rude "shack," or shed, in which to house his stock, but, as a citizen of a new community, he was also in duty bound to aid in general public improvement, to help blaze trails through the bush, as a means of communication between settlers, and subsequently to organize Municipal Councils, school boards, churches, and agricultural societies, and through these agencies to levy taxes, make roads, build bridges, erect school houses, secure teachers and preachers for the schools and churches; and thereby lay the foundation of general progress and prosperity. These were the very rudiments and essentials of early settlement. They constituted the topics for public discussion at the early "town meetings," "logging bees," "barn raisings," and elsewhere ; and they engaged the attention of Municipal Legislators and local authorities generally.

Great progress in many directions has been made in the meantime ; nevertheless, for over a hundred years from 1793, when what may be called the first Municipal Act was passed, the people of Ontario have been chiefly engaged in providing for themselves the material necessities of life, establishing upon a firm and liberal basis Municipal and Parliamentary institutions, organizing and improving an efficient system of education, and establishing and maintaining religious institutions, to meet the varied wants of a mixed community. Nor have we as their descendants much fault to find with the way in which this work of our forefathers was done. All of them did not enjoy the educational advantages necessary to qualify them for efficient public services ; but they were usually honest of heart and meant well. They made mistakes, but even if they had made none, the work done by them in the past would not suffice for the demands of to-day. Time has wrought wondrous changes. Railways, telegraphs, telephones, gas, and electric lighting and an infinite number of labor-saving machines, on the farm and in the factory, together with the application of more skilful and scientific methods in our agricultural and industrial life, have united to revolutionize economic and social conditions, and have brought us face to face with new duties and wider responsibilities. We have entered upon a new century of progress. The limitations of the past will not meet the demands of the present, nor satisfy the aspirations for the future. New conditions impose new responsibilities. The Ontario of to-day is not the Upper Canada of 1800, nor is the Dominion of to-day the Canada of 1793. The civic horizon has been broadened, and the civic spirit of the future must be alike higher and broader than was that of the past.

In recognition of this changed condition, a recent meeting was held in Toronto at which prominent representatives from many parts of the Province were present, and there was organized a "Canadian League for Civic Improvement." The League is composed of ladies and gentlemen, who are interested in civic reform and are willing to contribute of their means and time to promote it. The work of all its officers, directors and members is done voluntarily and gratuitously.

The chief objects of the League, in brief, are to promote a higher civic spirit and a wider interest in the improvement and beautifying of our cities, towns, villages and rural districts. The League also seeks to secure the assistance of ladies and gentlemen and the co-operation of all organizations that are interested in the promotion of these objects. The League is anxious to be of service to all, and to antagonize or displace no existing organizations that are efficient. It recognizes the splendid results that have followed the work of Ontario's Agricultural College in its several branches ; of the Dairymen's Associations ; Farmers' Institutes ; Bee-keepers' Association ; Agricultural and Horticultural Societies ; Fruit Growers' Association ; Stock Breeders' Association, and many others, whose united work has given the Province its present progressive, and, indeed, premier position. But while paying just tribute to all these organizations, whose objects chiefly concern the material progress of the Province, is it not time that our attention should be turned occasionally and at least to some extent from the mere necessities to the aesthetic surroundings and comforts and it may be also the luxuries of life ? It is not enough that so progressive a Province and so prosperous a people should have merely comfortable homes ; they should be homes of culture as well. The country, naturally beautiful, should be made still more beautiful—beautiful for all its people—not less than fruitful. Nature has done much for it, but nature aided by art could do something more. There should be more out-door art and also more art within our homes. The field thus suggested is a very wide one, and may profitably engage the united efforts alike of Parliamentary and Municipal bodies, of Boards of Trade, Boards of Health, Farmers' Institutes, Agricultural Societies, Dairymen's Associations, Horticultural Societies, Art Leagues, Landscape Gardeners, Park Commissioners, College and School authorities, and, indeed, all other organizations that have for their object the betterment of society. All of these, supported by a sympathetic people, should co-operate to the same end; the creation of a higher civic spirit, the improvement of civic conditions, and the making of our Province and Country a more pleasant and attractive, not less than profitable, place in which to live.

Something has already been done in this direction, but much yet remains. Let me suggest some of the directions in which such efforts may proceed.

In Cities, Towns and Villages.

Civic improvement in cities, towns and villages may include better streets, more tree planting, well-kept boulevards, more and better-kept parks and play grounds, improvement of public buildings, school houses and churches by more general use of vines, ivy or climbers, more artistic grounds about all of these buildings, and a more general planting of shrubs, trees and flowers therein, the erection of statues, the providing of fountains, public lavatories and closets, public gymnasiums and rest rooms, cemetery improvement, improvement of railway station grounds, planting of trees and flowers around factories, improvement of vacant lots, lanes and alleys, a greater attention to public sanitation, a perfect sewage system, improved facilities for the disposition of garbage, more artistic public advertising, simplicity in naming streets and numbering houses, fruit and flower exhibitions, cleansing public buildings and public vehicles, a higher class of pictures in our public halls and our various public institutions, improved municipal architecture, including all public buildings and bridges, compositions and awarding of prizes to stimulate home-planting among the school children and citizens generally.

In Rural Districts.

Civic improvement in rural districts may also cover nearly as wide a field. It includes better roads, more drainage, better fences, more general tree-planting, evergreens and shrubs more generally planted and better taken care of, some flower-beds about every homestead, well-kept kitchen gardens, the shielding or covering of all unsightly buildings by trees or vines, better sanitation within the homes, universal bathrooms, lavatories and closets, the improvement of public buildings, school houses, school grounds, churches, manses, and glebes, by laying out artistically, planting therein trees, shrubs, flowers and vines, and providing well-kept lawns for each, also the establishment and care of parks in every municipality according to size, population and convenience, improving the architecture, approaches and general appearance of bridges, the encouragement of forestry, more particularly in the direction of planting copses of trees as a shade for farm stock, or to replace native trees that should not have been cut down This may be more easily done on the banks of creeks, streams, lakes and rivers whose surroundings lend themselves easily to beautifying. Groves and all woods that could be easily utilized for park purposes, and all evergreens that lend beauty to the landscape and other natural features, should be as far as possible preserved. Wayside springs should be preserved and made convenient for public use. Guide boards should also be provided along the highways.

An Inviting Field.

The above are some, though not all, of the subjects included in the task of civic improvement. It is not possible, within the limits of a paper or address to discuss them at length. They are sufficiently numerous to invite the effort of all our citizens, young and old, rich and poor. To the latter they offer a specially inviting field of profit and pleasure. The poorer sections of several European and American cities have been literally transformed from apparent squalor and wretchedness to beauty and comfort by the efforts of civic improvement reformers. Productive vegetable gardens have replaced ash heaps and back-door debris, while well-kept boulevards and lawns, flowering shrubs, vines and flowers have taken the place of bare yards and generally tumble-down surroundings.

Those Unattractive School Houses.

All who have travelled through our country districts must have noticed how unattractive are the rural school houses and their surroundings. The walls of the buildings are bare and unrelieved by a touch of green in the form of ivy, climbing roses or other vines. There are no trees or shrubs about the ground, nor are there flower-beds. The grass, if grass there be, is uncut, the fences are not always in good repair, and the outbuildings forbidding and offensive, are vulgarly exposed to the public gaze. And yet these are seats of learning! Here is where our children receive their first impressions of education. "Like produces like" it is said; if so, what must be the impressions made by surroundings so rude and repellant? There is also noted an absence of a flag pole or flag, which every school section should have; and such flag should fly on all appropriate occasions, familiarizing the children with our national emblem, and teaching them to love and honor the dear old Union Jack, though it be "Only an old bit o' bunting!"

The Churches Also Neglected.

Then our rural church buildings are little less unattractive than are the school houses. They, too, seem to be neglected and uncared for. One might easily imagine that they were seldom, if ever, visited, so cold, bare and uninviting do they appear. If surrounded by a cemetery, as they usually are, it, too, looks neglected and ragged in the extreme. Respect for the dead if not for the living should suggest an improvement in this respect, and surely our places of public worship should be made as attractive in their exterior as are our own homes. The spirit of true worship is sacrifice, and professing Christians should show, not only by the substantial character of their churches and attractive interior, but also by pleasant and picturesque surroundings, that they are willing to sacrifice of both time and means to beautify the temples which they have erected for the worship of Almighty God.

Railway Stations and Grounds.

Another direction in which improvement may be made by vines, shrubs, flowers and well kept lawns are our railway station houses and station grounds. This is becoming more important because of the building of electric lines of railway. The same improvements should be made, and, indeed, insisted upon by the public, upon the station houses and grounds of electric railways as are necessary on steam railway properties. These improvements should be made a condition of granting franchises to companies when they apply to municipalities for them. Another condition that should be insisted upon is that all land lying alongside electric railway tracks and belonging to the companies should be kept clear of noxious weeds, and in general be well cared for. Otherwise these roads may become eye-sores to the travelling public and a menace to the crops of adjacent farmers.

Shade Trees Along Highways.

Tree-planting along the roadways would add greatly to their beauty, and if done judiciously and the trees not planted too closely, while affording a pleasant shade would not necessarily injure the roadways by holding the water, and thereby making them damp or wet

Beautifying Rural Homes.

A strong effort should be made to induce our friends, the farmers, to pay more attention to beautifying the exterior of their homes and surrounding grounds. Farm houses are usually located advantageously for improvements such as are suggested. An ivy, a climbing rose or any creeping vine would relieve their bare appearance, while some pretty flowering shrubs, a few evergreens, and some flower-beds would add greatly to the beauty of the surroundings. But what is still more important, they would probably inspire some members of the household to take a special interest in thus beautifying the homestead, and thereby making all more contented with the home and its environment.

Copses of Shade Trees.

Then in the older parts of Ontario and the other Eastern Provinces where the larger part of the farms have been entirely denuded of trees, when the trees of the forest were felled, some attempt should be made to partially replace them by planting, in appropriate places, copses of evergreens or shade trees. These are not only valuable as shades for the farm stock, but would greatly add to the beauty of the landscape. In the absence of hedges such as are in the old countries, and which serve the purpose of fences there, trees scattered here and there over a farm add much to its appearance.

Rural Parks.

Not only so, but every rural municipality should provide itself with one or more parks, which would become common and convenient resorts. Public gatherings, picnics, private or public, could be held there. Nor would there be any difficulty in securing suitable and attractive locations—no township is without them. In many cases they are there ready to hand with forest trees, water convenient, and the general topography all that the landscape gardener could wish ; the cost of purchase would not be great, nor would the expense of properly keeping them up.

National and Provincial Parks.

In this connection it is pleasant to note that the Governments of the Dominion and of Ontario have led the way in the establishment of National and Provincial Parks. The late Hon. Thomas White, when Minister of the Interior, established a magnificent park, in the Rocky Mountains, at Banff, on the line of the Canadian Pacific Railway ; the late Sir Oliver Mowat, the Queen Victoria Niagara Falls Park ; and the late Hon. A. S. Hardy, the Algonquin and Rondeau Parks. There is yet room for the establishment of many more such resorts of recreation, profit and pleasure for the Canadian people.

Good Roads and Civic Reform.

The above suggested improvements are all in harmony with the general improvement of the highways of the country, which in recent years has made considerable advances, and has now reached the stage of Government and municipal control in the form of good roads improvement.

A Canadian Paradise.

With good roads to drive, wheel or walk over, with the highways tree-lined, the landscapes improved by replanting, the school and church properties which we pass beautified by well-kept lawns, shrubs and trees, vines and flowers, with a telephone in every house, an electric railway system covering every city, town and township, a rural mail delivery at every door, and an automobile, it may be, for both lighting and transportation purposes, in every homestead (for myself I prefer a good horse or spanking pair) ; then with the National Flag floating from a flag-pole at every school house, from Dawson to Halifax, how much more pleasant it would be to travel in the country, how much more patriotic we would feel, as Canadians, and how much more right we would have to be proud of our native land !

Urban Civic Reforms.

This paper is necessarily too brief to permit me to enlarge upon even a tithe of what is aimed at by the Canadian League for Civic Improvement in the direction of further beautifying our cities, towns and villages. All of these should have parks, picturesquely situated, wherever possible, tastefully laid out and always well kept. There should be more boulevards, more planting of trees, better kept streets, more cleanly lanes and alleys, an improved garbage system, more official attention given to regulating architecture, building of sidewalks and landscape work. Fountains should be provided as conveniences, and all local historical events should be appropriately marked by monuments or memorial tablets.

Necessary and Patriotic.

But by some it may be said that these suggested reforms are comparatively unimportant, and that the Canadian people cannot be sufficiently interested to carry them out. I deny both of these statements. They are not unimportant, for they tend to make happy homes, and they are urgently needed to meet the requirements of present conditions. Canadians are now beyond a primitive or primeval stage. They are for the most part able to do more than merely exist. They can now live and enjoy life in pleasant, if not luxurious surroundings. Being well able to afford to do so, it is nationally important that they should not neglect their opportunities and responsibilities. Their sons and daughters are better off, better clothed and better educated than were their fathers and mothers, and the more comfortable and attractive the surroundings of young people are, the more happy and contented will they be. Not only so, but they will grow to manhood and womanhood with greater affection for their parents, stronger attachment to their homes, and more fervent loyalty to their country. They will thus be happier boys and girls; more contented men and women, and, therefore, better Canadians.

A VISIT TO THE OLD WORLD.

By L. Woolverton, Grimsby.

Three months in Europe covers much more ground than I can even summarize in a brief address, and I will not weary you by much detail. In general, my impressions, after visiting Great Britain and Europe, are decidedly in favor of Ontario, either as a field for enterprise, or as a home in which to live. Those old-fashioned stone buildings, moss-covered with age and old-fashioned in style, such as you see in Oxford, in Blenheim, in Warwick or Rowsley, and, indeed, everywhere in England and on the Continent, strike me as being a hindrance to growth; they would need tearing down and carting away before a modern building could go up. And, when you add to these material obstacles the sleepy conservatism of the people, you have conditions most unfavorable to rapid progress. Nobody is in a hurry in England; if you want a cab, you do not telephone for it, but go and hunt one up; there are no electric cars in London proper, but the streets are full of old-fashioned two-horse omnibuses, with seats on top, to which you climb by a spiral staircase behind, and up there you travel slowly through crowded Oxford street, Regent street, or the Strand, and view the buildings and the masses of people at your leisure. The railway trains do not travel quickly enough, but are very awkward; the same car is divided into numerous compartments, much alike, except for the labels, 1st, 2nd and 3rd class, intended to divide the passengers according to their rank; and when once locked in, you are in prison till the guard unlocks your door again. The cars are very small, especially the freight cars, but years ago the bridges and the tunnels were made for small cars, and to enlarge the latter would mean a complete reorganization, and entail endless expense.

The wagons in England are very funny in form, and carts are much more used by farmers than with us. The latter are used entirely by the truck gardeners about Paris, who come into the city in the evening and stand in a row near the Louvre. Here the horses are fed with nose-bags, and the driver sleeps till morning on his seat, ready for the early market, with his heaps of white onions or yellow carrots, all beautifully clean. In Belgium the women take the vegetables to market in small carts drawn by dogs, who travel underneath between the wheels; while in Switzerland we saw the women everywhere making hay and drawing it to the barns with teams of cows. At Rhine Falls, near Shauffaussen, we watched a young girl of about eighteen bring out her cow, harness it up singly to the hay waggon, throw on her hay fork, jump aboard and drive off up the mountain side after her load, just like a Canadian boy. The cutting of the hay was done by the men, but the rest of the haying seemed to be largely left to the women. It was a curious method these men had of sharpening their scythes, by beating them with a hammer upon an anvil; truly the blades were made from very different stuff from those we use. Near Rhine Falls we watched the process, and certainly the man made a good job of it.

The lack of appreciation of the beautiful was very evident with this same farmer. He stopped his work to show us his Jersey cows, for which he could not find words to express his admiration, but not a word had he for the charming scenery presented by the Valley of the Rhine, and the distant snow-capped Alps. So little did he value this magnificent view that he had placed the back of his house on the brow of the hill commanding the view, without a porch or scarce a window opening that way.

But, if among the poorer classes the condition of life is inferior to ours, the rich have much to boast of. No one could sit and watch the handsome equippages of Rotten Row in London without admiring, as we did, the splendid turnouts, with liveried coachmen, magnificent horses, and elegantly attired ladies, which keep up a constant procession through Hyde Park between four and six in the afternoon. These horses and carriages are in perfect condition, and the pride of their owners. Their stables are a model of order and cleanliness for our Canadian boys who too often think it needless work to sweep a stable floor or dust a carriage before using it. We met an American tourist in London, and invited him to accompany us to see the King's stables at Windsor. Quite indignantly he replied: "I did not come all the way to England to see anybody's stables."

The great castles of England are her pride, and immensely interesting to a Canadian. We were shown through Kensington, rich with souvenirs of Queen Victoria; through Windsor, with its magnificent state apartments and royal treasures, and through Warwick Castle, with its wonderful galleries of art and precious treasures; also the ancient Haddon Hall and the elegant modern Chatsworth, at Rowsley; Edinburgh Castle and Holyrood, at Edinburg, and Stirling Castle, at Stirling; and, while we admired these great halls, rich in historic interest, we felt a sense of relief that we in Ontario have not the responsibilities attendant upon such great houses. Far from each other, and with few of equal rank at hand, these great people know nothing of the quiet, happy social life of the Canadian farmer.

Farming in Great Britain is in a retrograde condition, and many of the farmers say they are losing money every year. Rents are high and prices declining, while labor is more expensive than formerly. The fields are small, and all divided by hedges, which must entail endless expense in keeping them trimmed. Once I was an ardent advocate of hedges, and dreamed of the time when our farms would be modelled in this respect after Great Britain, but my visit to the old world has completely revolutionized my notions. Even with the cheaper labor in that country, many of the roadside hedges go neglected; what would they be in this new world, where labor is not only very expensive, but often not available at any price? Rather for us would I choose the conditions which we saw in Germany, where we rode for hundreds of miles through beautiful farms without a single dividing fence, a simple white stone here and there marking the corners.

Fruit growing in Great Britain seemed to me rather discouraging. True, the markets are good, but the cold, wet climate causes fungi and mosses to almost cover the trees; there is not enough sunshine to paint the cheeks of the outdoor grown fruit, and often the spring frosts completely destroy the crop. Having an introduction to Mr. A. J. Thomas, of Bargainhill, near Sittingbourne, in Kent, one of the principal fruit growers of that country, who has 150 acres in orchard, we were much interested in his fine old cherry trees which had been planted by his father years before. He grew all the fine old English sorts, such as we have in Ontario, but, "This year," said he, "my crop is ruined with frost, and I have not enough fruit to pay for picking."

Near Melrose, in Scotland, we visited a very old garden, planted out by the monks hundreds of years ago. The walls were about ten feet high, and covered with apricot and plum trees, trained like vines. Around the paths were the finest Cordon apple trees I ever saw; one of them in particular reaching out its arms about thirty feet in either direction, and making indeed a valuable curiosity; but, like nearly all apple trees in England, the bark was so thickly covered with moss as to threaten the very life of the tree. We asked the gardener why he did not scrape it off. "Oh," he said, "we never think of doing that; for if we did, it would only grow on again." We talked of alkaline washes and Canadian methods of cleansing the bark, but he did not believe in such rubbish. So we came to the conclusion that the conditions for successful out-of-door fruit growing in Ontario are far in advance of those existing in Great Britain.

But I must cut short what I might make a very long story. In conclusion, let me refer to the great apple markets. These we visited in London, Edinburgh and Glasgow, and were amazed at the rapidity with which fruit was knocked down to the buyers. In Covent Garden we were most kindly treated by Mr. Garcia, of the great firm of Garcia, Jacobs & Co., who placed us in an advantageous position for witnessing the auction sale of 1,500 cases of Tasmania apples. The time occupied was little more than half an hour, and yet the prices were very satisfactory. Their boxes are not nearly as attractive as those our apple growers are using; they are smaller, too, holding only about forty pounds of fruit, and the fruit itself is not packed in them so neatly, although in most cases wrapped with a thin paper. The favorite variety from Tasmania seemed to be the Sturmer Pippin, which sold wholesale at from $2.25 to $2.50 a box. Mr. Garcia gave us a sample to eat, and certainly the flavor was good. In size it is about equal to the average Baldwin, but not so highly colored. In our opinion it cannot be compared to our Canadian Baldwin, and if we could place our Spys and Baldwins side by side with these Tasmanians, in equally perfect condition, we would not fear the result of the sale. The highest prices for apples are realized toward the end of May, the lowest average price being $1.75 to $2.50 per forty-pound box, because the American apples are over and Tasmanians have scarcely begun coming in. Speaking of the best time to get the highest price, one Covent Garden salesman said bluntly: "If you are going to spend your money in cold storage, you should sneak a week where you got it yourself," and no doubt he said a truth.

Messrs. Garcia, Jacobs & Co. have handled as many as 27,000 packages of fruit in one day so it is evident they do a large trade, especially in apples and oranges. "We paid one firm in France," said Mr. Garcia, "£5,000 in one week for consignments of plums, which will give you some idea of our business."

Taking all things into consideration, we came away rather encouraged than otherwise with the prospects before the Canadian fruit growers, and see no reason for discouragement, when we consider how favorably our fruit and our packages compare with those of the European countries.

In Edinburgh we called upon Messrs. James Lindsay & Sons, one of the largest apple houses in the city. "We buy your Ontario apples at Glasgow," said Mr. Lindsay, "and find them prime stock. Your Ontario Duchess pears, too, please us very much. We bought a lot of them last year from Thomas Russell, Glasgow, and made some money on them."

In Glasgow Mr. Russell showed us the apple salesrooms, where we found the business conducted in much the same manner as in Covent Garden. If a man's brand is reliable, he will soon become known, and his fruit will command ready sale at top prices.

Pears are in good demand in Glasgow, and our Canadian Bartletts would bring us excellent returns if we could get them carried at or near the freezing point, so that they would arrive in good condition. Since our return, we have given this market a good trial, having forwarded two carloads. The first, by the Lakonia, of the Donaldson Line, arrived in fairly good condition, and returned a net of $2 a bushel ; the second, by the Sicilian, of the Allan Line, arrived in an over-ripe and wasty condition, and brought little more than freight charges. Both carlots were packed in a perfectly green and hard condition. This shows that our ocean cold-storage for fruit is yet far from perfection.

Altogether we returned to Canada, not only refreshed in mind and body, but vastly more contented with Canadian conditions of social life, and with the outlook for Canadian horticulture than when we sailed ; and we no longer wonder at the wonderful inflow of people to our fair land, for we believe there is no better country on the face of the earth.

NATURE STUDY.

By Dr. W. H. Muldrew, O.A.C., Guelph.

Very much is being said just now concerning Nature Study, Manual Training and related subjects in our schools—much that is vague and indefinite, and utterly unsatisfactory, and much that is even false and contradictory. And the fact that we are asked to discuss these questions to-night seems an indication that plain, intelligent men and women are looking for light in this darkness and confusion.

The naturalist will tell you that nature study consists in the study of animals and plants, with the aim of classifying them, and possibly recording their habits ; the scientist would say that it consists in the accumulation of facts and generalizations about the world we live in ; while the nature lover, the artist or the poet, will define it as the cultivation of a sympathetic attitude towards Nature. The practical man looks upon this as merely the latest fad of educational cranks, another wedge to crowd out what remains of value in our schools. And there is surely some ground for such an attitude, when we consider the number of exploded theories, each of which was once heralded as a cure for all our ills. I need only mention to teachers who are present such topics as object lessons, language lessons, temperance lessons, the word-method, the Grube method, or last, but not least, "vertical writing," to show that fine-spun theories are too often sadly disappointing in their results.

Finally, to the teacher on whom must depend very largely the success or failure of any method or system. What is implied ? Very often I fear that these newer subjects must be suggestive merely of added burdens to be undertaken without adequate preparation or guidance.

Now, if we had the necessary time, it would be well worth while to consider these varied opinions at length, and to sum up the truth and error contained in them. But, just now, let us hasten on to ask for the evidence of one more witness more important than any of these, because more interested and less biased. Let us ask the child himself what he has to say in the midst of all that is being said about him. I am prepared, of course, to be told that such is the height of absurdity, and that my witness is not only ignorant as to his real needs, but is essentially perverse and wilful in his whole nature.

It is unnecessary for us here to discuss the moral question, but as regards the physical and intellectual aspects, I am free to say that the child's native tendencies are essentially right and necessary to his well-being. Without the aimless movements and babblings of early infancy, the muscles would never be prepared for walking or for speech, and is it not true that under the guidance of such native tendencies more is learned during the first five years of life than in any later period of equal length ?

Nature takes abundant pains in the education of her offspring, but with none so much as with her masterpiece—the human child. The young of the lower animals are guided by unfailing instincts, and surely man alone is not left without a witness. No one who has paid any attention to the development of a child can have failed to note his untiring interest in the world around him. The needs of men are knowledge and power, adapted to the society in which they live, and the child anticipates these needs in his insatiable desire to know his surroundings, to express himself in action, and to follow in the steps of his elders.

Thus, turning from the doctors who differ, to the child himself, we gain some idea of his real needs. From this point of view we can see the necessity for meeting the child on his own ground, and using the experiences of his daily life as a basis for all future education. Nature study aims to develop the child mind by appealing to the interests and activities of childhod. *It is thus a method rather than a subject, and deals with nature as a means rather than as an end.*

The most effective charge against our modern education is that it lifts the learner out of his surroundings, and seeks an artificial development quite out of relation to his experience and his interests. The schools are credited with turning the tastes of the people away from the farms and the simpler industries, while the universities are said to produce "impractical" graduates. Nature Study aims at schools in living relation with the lives and experiences of the people, in which the most successful student will be in closest touch with the needs of the real world.

Looked at in this way it is plain that Nature Study is no new thing in education. Every healthy child makes, and always has made, such the basis of his life's training. His early years are spent in ceaseless endeavor to comprehend the world around him. To this end he examines all things, tries all things, and torments his elders with pitiless questions as to the what, the why, and the how of every new experience. As a result the dullest child quickly masters a immense amount of practical information, and thus puts himself in harmony with his surroundings.

For the later loss of interest of this enquiring spirit the blame must be shared by schools and parents. The schools are to blame in so far as they have insisted that their studies must be different in kind and method from the earlier experience of their children. Parents, on the other hand, have nowadays no time to guide further this healthful development of infancy, and thus the growing boy or girl too often suffers. The interests of the home life are crowded out or lost from disuse, while nothing adequate is supplied to take their place. Learning is divorced from doing, and the common aim of both as a preparation for life is forgotten. Studies which either in themselves or in their teaching are unreal because unrelated to experience have been the bane of elementary education.

The application of this principle in our schools is plain. The vast majority of our people are, and must continue to be, engaged in agriculture or other productive industries, and this fact must be recognized in the education of the future. In training the eye to see, the hand to do, and the mind to think in childhood, the best materials must always be found in commonplace experience, and the practical interests thus fostered must continue to be those necessary to the very existence of society.

I should like to call your attention for a moment to certain other aspects of our subject. I have the word of Mr. J. L. Hughes for the statement that horticulturists are one of the most moral classes of people in the world, and that gardeners are very rarely connected with any crime. This is no doubt due largely to the nature of their occupation, and to the fact that they see the relation between cause and effect, between conduct and its rewards, in such a concrete form that they cannot forget it. Can we doubt that surroundings which affect thus the full-grown man will be much more powerful in their influence on the growing child ? A man's life is more than his possessions, and the thoughts that fill his mind are more than the fruits that hang on his trees. The emotional side of man's nature depends very largely on the experience of his childhood. He who has never been a child and who does not continue to be a child until he is old misses much of this life. The man who in his childhood has lost communion with nature must have all through life a terrible blank in his mind, where he might have had something of constant value and influence as long as he might live.

Such principles are not opposed to the highest ideals of a truly liberal education. All experience goes to show that a mind trained to interpret the commonplace truths of nature gains in this way a mastery over facts and methods of thought that will prove of equal value on the farm or in the university. It has been well said that the education of the past has filtered down to the people from the universities, whose ideals were inherited from Greece and Rome. The education of the future will rise up from the people, based on the needs of life here and now, and will thus gain a vitality impossible to artificial systems.

To further such aims is the purpose of the Macdonald Institute at Guelph, which I have the honor to represent here. This institution has been built and equipped by Sir William Macdonald as a college for the preparation of teachers fitted to apply in detail the methods here broadly stated. In addition to this, however, there are provided thorough courses in practical household science, which are intended to be to our young women what the O A. C has already become to our farmers' sons. In such ways we hope to exert a healthy influence on the schools and the people by showing the unity of Education and Life.

CO-OPERATIVE FRUIT PACKING AND MARKETING

By W. H. Owen, Catawba Island, Ohio.

When the stockholders of an industry are meeting with successful results in the disposal of their products, little thought or attention is given to competitors along the same line, until competition, over-production or under-consumption depreciates the value of their products to little more than the actual cost price of same ; they then give their attention to methods that will better their conditions, and devise ways and means by which they may reduce the cost price and competition.

How is this change for the betterment of their conditions usually brought about ? Invariably through the same channel, by organization, by trusts, and by co-operative associations. What is true of the manufacturer in this direction is also true with the farmer and horticulturist, in the disposal of their products.

The Californians were probably the first to co-operate in marketing their vast product of fruit, which was really the result of necessity, for their industry rapidly expanded, until their local markets could not consume the enormous production, and they were obliged to seek other and more distant markets. This they found could not be accomplished individually, but through powerful corporations they have succeeded in gaining low rates and improved methods in handling and shipping. How well they have succeeded we are all familiar, and now we find their fruits in nearly every market of the country—even competing with our own products in our local markets. Organizations, judiciously managed, have placed the Californians in the lead in the way of distributing and marketing their fruits. Through their efforts, is due the credit of perfecting the present refrigerator service, by which they are enabled to ship their more perishable fruits, even to the great markets on the Atlantic seaboard.

Missouri is fast accepting the profitable teachings and examples of the Californians, and her vast fruit products are now largely handled through companies and shipping associations.

Michigan, having the greatest market in the world at her very doors, had no occasion to look elsewhere than Chicago or Milwaukee for her markets. However, the Wolverines have discovered in recent years that the enormous contributions of fruit from Missouri, Southern Illinois and Indiana to these markets, has in a measure forced them to look elsewhere for a portion of their markets. They now ship hundreds of carloads of peaches annually to Eastern markets and the Western and North-western States. This was not brought about, however, until co-operation among the growers in different localities was instituted.

The extreme Eastern peach-growing States—New Jersey, Maryland, Delaware, Pennsylvania, and New York—are so favorably located in reference to so many large consuming markets that organization to them has not been so paramount to their success as it is to the Middle and Western States.

The further from market the greater need of getting together, as the risk increases with the distance.

I will confine my discussion principally to the advantages in organization for handling one of the most perishable of the tree fruits, viz., peaches.

Peach shipping associations have been operated with more or less success throughout the peach belt of Michigan and Ohio, but in shipping in carload lots, although complying with rigid rules laid down by the Association, there was an objectionable feature to the trade, and that was the lack of uniformity of grades and packing. To be more explicit on this point, you have all probably visited some of the various markets during the peach season, and have noticed the very great difference prevailing in grades of different packs. That is, some packers' B or XX grades were just as good as some other packers' A or XXX grade. Therefore, the grade marks of the general run of consigned fruit, where not put up by one set of hands, as a rule, are not of very great assistance to the purchaser, and he still is obliged to resort to his own judgment and eyesight in his selections. Now, for a shipper to make up a carload of this indiscriminate packing of fruit, where it is packed by many growers, each contributor having a different way and idea of how peaches should be packed and the kind of packages used—conceding that they are all honestly packed—how is the shipper going to bill that indiscriminate lot of fruit, and can he warrant the packing? This serious objection of lack of uniformity confronted the Michigan fruit growers, and has resulted in the adoption of the central packing house system by their principal associations. This system was originated and established in the peach industry at Catawba Island, Ohio, in 1891, and it has resulted in untold savings and benefits to the peach grower wherever the system has been adopted.

The mere shipping association, where each grower prepares his own fruit and delivers it to the association, by which it is shipped with other packs and packages, either in carload lots or local shipments, is a step in advance over the old or individual method of shipment; but the central packing house system is a much greater step in advance over the mere shipping association.

The old adage of, "In union there is strength," is most aptly exemplified through the many advantages that may be attained through an organization of fruit growers, organized for the purpose of bettering their conditions in shipping and marketing their fruit. The many discouraging problems that confront the grower in the satisfactory marketing of his product, I believe, are satisfactorily solved through the adoption of the central packing house system. At least, such has been my observation through the management of such a company for the past twelve years.

Let us for a moment review further a few of the advantages to be attained through such an organization. First, the grower can place his undivided attention to the proper picking of his fruit, which is a very important factor; whereas, it is known, that if peaches are picked green or immature, or over-ripe, and delivered to the packing house in such condition, no amount of work that may be put upon it can make good prime fruit of it. The great advantage of the central packing house is the superior advantages and inducements it offers to purchasers of fruit in securing a uniform grade and pack. It affords a place where the buyer can select just the grade and kind of fruit that best suits his trade. When the fact is known to the trade that they can procure their supply direct and in any quantity desired, and every package guaranteed to contain freshly-picked and uniformly-packed fruit, even the commission men will then come to your doors and buy. Buyers are looking for carloads of uniform fruit, and not for carloads that are not uniform.

This system entirely eliminates the practice of deceptive packing, and gives buyers confidence that they are getting honestly packed fruit. Even were you obliged to consign largely, it will bring better prices on the market, and the commission firms are bound to take better care of your interests than of the individual shippers ; because there is more at stake, and the merchant realizes that if he makes a mistake or misleads you in his advices, he will probably not have the opportunity of handling your account again. The labor saved at both ends, by dealing with one man or corporation instead of ten or fifty, becomes apparent, and the commission man can afford to handle a corporation account on a less percentage, and it really pays him better because of work and time saved. And again, buyers, after becoming acquainted with your grades, pack and manner of doing business, can order their supply of fruit intelligently and without the necessity of retaining a representative at the shipping point.

Another great and beneficial effect of such an organization is through its influence in broadening the field of distribution ; it does to that extent disprove the "over-production" policy.

We have found that in our own dealings with transportation companies, basket manufacturers, and even the commission men, they lend a more willing ear, and correct errors and abuses with greater promptitude when presented by the authorized representative of a company than they will do for any individual or small grower presenting a case possessing equally as much merit.

Transportation companies consider a well-organized fruit company, working upon sound business principles, in the same light as any other well-established business which contributes to their receipts.

We as a company have found them disposed to grant favors and investigate complaints fairly, while the lone individual, under the old plan of "every fellow for himself," would perhaps have remained unnoticed.

Lastly, a recommendation that is appreciated by those that have had the experience in the central packing house system, is the fact that it relieves the home and good housewife of that burden which is attendant through the care of the extra help that will now be dispensed with.

Now as to the expense of organization under this system. Some may raise the objection that it will cost too much to establish a plant, but you will find after careful investigation it will be far cheaper for each to contribute toward a general plant than for each individual to supply himself with a packing house, a grader, and other necessary equipments. In the establishment of a central packing house, make sure of one point, and that is, provide a building with ample room for receiving, grading and expeditious handling of the fruit. If the requisite amount of floor space is not provided, it will necessitate vexatious waiting of the members in taking their turn at unloading their fruit.

Do not think that a room with no more space than would ordinarily be used by three or four of the larger growers of the company and equipped with insufficient number of graders will properly take care of the fruit of twenty or thirty orchards, for it will not, and such conditions will only result in loss, through failure in being able to get the fruit through promptly.

As for laying down defined rules for organizing, that is a matter which each locality will best work out for itself, as local requirements and conditions vary.

Now, what is wrong with the present system, or more properly, lack of system, outside of the already established organizations ? Can you name any industry wherein so many hundreds of thousands of dollars are invested, that is conducted so carelessly as the fruit business of this great fruit-producing country ? It is a great wonder to me that the average peach grower should even get the price of his packages in return for his labor. To make it plain, the average orchardist cannot afford himself the facilities for keeping in touch with the trade, and keep posted daily on the changing conditions of the various markets. He is too busy harvesting his crop to study out the best plans and inform himself of the best places to ship, in which he will meet the least competition. And right here I wish to emphasize that word "competition," for are we not each and every one of us placing our fruit in direct competition with each other? Again, the orchardist individually is placed at disadvantage through his inability to properly distribute his fruit. I say inability, because he has no control over other shipments, and has no means of knowing but that 90 per cent. of the other shippers throughout his vicinity are shipping to the very market in which he expects to avoid a glut.

There is surely a way out of this dilemma, and a practical and time-tried way, that I am confident, if universally adopted, would place the product of the orchard on a far more profitable basis than is now being realized. As long as the present careless methods are continued, we may expect to be the victims of our own failure to protect our interests by the positive means within our reach.

If we will carefully investigate the hundreds of unions and co-operative plans that are now in existence in nearly every branch of business, you will find they are all declaring handsome dividends to their stockholders, while prior to their consolidation, in many cases they were actually running at a loss.

What has been true in other branches of business through result of co-operation to avoid competition, and reduce the cost of placing their products on the markets, can be made true of the fruit industry in the different fruit growing sections of the country. It is not a visionary and undemonstrative theory. It is the furtherance of a co-operative plan that is now in actual, practical and successful operation in several of the States; and the more universal this system may become adopted, in like proportion, better results will follow.

If some of the fruit organizations have not proven entirely satisfactory to their members, due to mismanagement, that should not prejudice or deter those interested from investigation of the plan; for there are fruit companies that are thoroughly successful and making money for their members. The co-operative fruit company will succeed if organized and managed upon a business basis, just the same as any other business enterprise requiring co-operation. It is surely the best means in which to conserve the interests of the producer, and we know that the grower's interests can be best served through facilities which they may own and control.

After thorough local organization has been effected throughout the various fruit-producing sections, let us for a moment see what further advantages might be attained in the way of uniting all these companies in each county or section into one powerful corporation.

County consolidation could be successfully accomplished only through the central packing-house system, and then not until local organizations had been established and perfected at the shipping points throughout the county. After the establishment of companies at the different shipping points, then the consolidation of all, into one powerful union under one management, would place the fruit-growers in possession of the key to the situation of the avoidance of market gluts, competition and distribution. To accomplish such an end of thorough organization it would mean for each locality to enter the work with a spirit of determination. We must be prepared to join our neighbors in correcting the existing wrongs and surmounting the obstacles and objections that may confront us. We have the power, and we can do it if we see fit. As one of our western horticulturist very aptly stated: "If I were compelled to use but one word in designating the remedy for the many evils and disadvantages with which we have to contend, it would be 'organization.'"

Organization leads to co-operation, and organized co-operative effort is the power and influence that is shaping and moulding the financial and commercial interests of the present time. Look where we will at any business worthy of the name, and we find it compactly united in some form of union that seeks to make the interests of one, the care of all and the prosperity of all the prime object of each individual.

CONSTITUTION AND BY-LAWS

Of the Island and Gypsum Fruit Company, incorporated under the laws of Ohio. Capital stock $5,000. Act amended June 13, 1900.

CONSTITUTION.

Section 1. This association of fruit growers, being incorporated under the laws of Ohio, shall be known as the Island and Gypsum Fruit Company. Its capital stock being in the sum of $5,000.

Section 2. The object of its organization is for the sale of the fruits grown by its members, also to buy and sell such fruits during the season as opportunity presents.

Section 3. The annual meeting of the stockholders of this company shall be on the first Saturday in December of each year. Special meetings of the stockholders may be held at any time upon call of the President, by written notice mailed to each stockholder of record.

Section 4. At the annual meeting of the stockholders five Directors shall be elected.

Section 5. At any meeting of the stockholders a two-thirds representation of the stock, either in person or by written proxy, shall constitute a quorum for the transaction of business.

Section 6. The officers of the company shall consist of a President, Vice-President, Secretary and Treasurer.

Section 7. Immediately after the annual meeting of the stockholders and the Directors are elected, it shall be the duty of the Directors to elect the officers as named in Section 6.

Section 8. All elections of this company shall be by ballot, plurality electing, conducted by two tellers, appointed by the President.

Section 9. The President, or, in his absence, the Vice-President, shall preside at all meetings of the stockholders. In the absence of both, a presiding officer shall be chosen by the stockholders.

Section 10. The Secretary shall keep a record of the proceedings of all the meetings of stockholders and directors, and shall receive as remuneration the sum of $........ for each and every meeting, when such services shall be duly rendered by said Secretary.

Section 11. The Treasurer shall keep a correct record of all the receipts and disbursements and report the condition of the finances annually, or as often as the Directors shall desire.

Section 12. The Directors may select not to exceed three of their number to act as an Executive Committee (the President to serve as Chairman of this Executive Committee), to have general charge of the affairs of the corporation during the fruit season. This committee shall order all purchases of supplies. The Directors shall regulate the amount of compensation this committee shall receive.

Section 13. Any fruit grower in Ottawa County, this State, shall be eligible to become a member by a two-thirds vote of the stockholders of record at the time the application is made, also a two-thirds vote of members shall determine the value of each share of the stock that such party shall pay into the treasury, if he or she shall be admitted as a member.

Section 14. The Constitution or By-laws may be amended at any regular or special meeting upon a vote of two-thirds of the stockholders or stock in the affirmative.

BY-LAWS.

Article 1. The Board of Directors, during any season when there is not a failure of fruit, shall meet in session semi-monthly, beginning such meetings not later than July 15th of each year.

Article 2. The Executive Committee, during the fruit season of each year, shall meet at least once a week, or oftener if the interests of the company shall demand.

Article 3. The President shall have a general supervision of the business of the company.

Article 4. On or before the first of May of each year, when the fruit crop is not a failure, the Directors shall meet and name their Manager for the season.

Article 5. The Manager shall have charge of the business of the company in its detail, under the supervision of the President.

Article 6. The Manager and Treasurer shall give bonds in such sum as shall be acceptable to the Directors.

Article 7. The Treasurer shall receive all moneys from the Manager and deposit the same in such bank to the credit of this company. Such depository of the funds to be designated by the Directors. The Treasurer shall check the same upon order from the President, countersigned by the Manager, or upon order from Manager, as may be directed by the Directors.

Article 8. It shall be the duty of all officers to attend all regular or special meetings of the company, and to hold office until their successors shall have been elected.

Article 9. When a vacancy shall happen, either by death or resignation, in any of the offices established by the constitution or by-laws of the company, it shall be filled at the next regular or special meeting.

Article 10. At the annual meeting of the stockholders, each year, the Manager shall render a statement of the business for the season in full.

Article 11. Any member of this company may withdraw at any time, between December or the first day of April. Such notice of withdrawal must be given in writing to the President or any Director of this company. Thereafter it shall be the privilege of such retiring member to sell and dispose of his or her fruits as they shall elect, but this company shall not take or handle any of such member's fruit thereafter, during that season, unless it shall be determined by a two-thirds vote of all members in the affirmative.

Article 12. In consideration of the several assessments which have been placed upon the present stock of record, previous to 1900, to each and every member holding such stock there shall be issued (gratis) another share ($50.00) for every share so held.

Every member shipping not more than 3,000 bushels of fruit shall hold two shares ($100.00) of the capital stock, and shall take out additional stock for increased output, as follows :—

1 share for all over 3,000 bushels up to 5,500.
1 share for all over 5,500 bushels up to 8,500.
1 share for all over 8.500 bushels up to 12,000.
1 share for all over 12,000 bushels up to 16,000.
1 share for all over 16,000 bushels up to 20,500.
1 share for all over 20,500 bushels up to 25,500.
1 share for all over 25,500 bushels up to 31,000.

Article 13. The stock shall pay a dividend of 7 per centum, less incidental expenses, as repairs, insurance on buildings and taxes. This 7 per centum shall be collected from each member's fruit account in proportion to the number of bushels of fruit with which each has been credited.

Article 14. Dividends on stock, as provided for in preceding article, shall not apply in time of a failure of fruit crop. In such times dividends shall be void.

Article 15. No transfer of stock shall be lawful unless duly recorded upon the books of the company.

Article 16. All peaches, pears, plums and quinces grown by each and every member of this company shall be delivered to the company's packing house for grading, packing and shipment.

Grapes and other small fruits may be delivered to the company for sale or disposal, and shall be disposed of for the grower on commission of one cent per basket.

Article 17. Each and every member shall pick his fruit in prime condition and deliver same promptly to the company's packing house. In case green and immature fruit or overripe fruit, or windfalls, be delivered by any member, same may be accepted and said members shall be credited with average price such fruit may bring.

Article 18. Each and every member shall have the right to give away such fruit of his own raising as he or she may elect; but shall not seek, solicit or make sale of fruit outside of the company, excepting windfalls and cull grades of any fruit that may not be accepted by the company. Any member so doing shall pay into the company's treasury the sum of fifty cents per bushel for all such fruits sold, excepting sales of aforesaid grades.

Article 19. All fruit delivered each day shall be credited to the person furnishing the same at the average price which fruit brought that day.

One-third of the amount so credited may be retained by the company until the close of the season for final settlement, and from the aggregate of the amount so retained from each person there shall be, at the end of the season, before paying the same over to the respective members of the company, deducted all expenses and losses. All expenses of handling, packing and marketing fruit shall be borne by the several members of the company, in proportion to the number of bushels of fruit with which each has been credited. All losses and rebates shall be deducted in proportion to the money credit of each member.

Article 20. Whenever, in the opinion of the Directors it is impossible for the company to receive at its fruit house all the peaches grown by its members, they may permit individual members to grade and pack the same for shipment through the house, such period to be limited by the directors. Reasonable compensation will be allowed for such grading and packing.

Article 21. Permanent or temporary additions, extensions or any new buildings from time to time that may be constructed by the company, including the present ice house, the cost of same shall be paid by the stock of issue by a fund sufficient to meet such costs by an assessment upon the said stock as it shall appear against each and every member, and not as an item of general expense.

Article 22. The cost of ice and the cost of putting the same into the ice house as it now stands, and each and every season when the said ice house shall be filled, shall go into the general expense and paid for as named in Article 19 to the By-laws.

Article 23. Before the annual meeting, as named in Section 3 of the Constitution, if there shall be available funds in the treasury after all debts shall have been paid, the Board of Directors then, if in their opinion it shall be deemed best, can order a cash dividend to be declared and paid to each stockholder of record up to the first day of December of each year.

No.

Date ....

THE ISLAND & GYPSUM FRUIT CO.

Received from ....

.... Bushels Peaches, ungraded.

Other Fruits ....

....

Receiving Clerk.

PEACHES GRADED.

GRADE	CARRIERS	1	1-2	1-4	TOTAL IN BUSHELS	PRICE	AMOUNT
AA							
A							
B							
C							
		TOTAL OF PEACHES					
Culls							
Other Fruit							

Grader No.

TOTAL CREDIT, $

H. W. Dawson: Mr. Owen's paper is quite in accord with my own views on the subject I have always maintained that co-operation and a central packing house would be a great benefit to the fruit growers. The most successful fruit and produce shippers on this continent are those that have adopted this principle, and where they also have distributing agents to look after the distribution of their goods, so that they do not glut one particular market; or, if a glut must come, as will be sometimes the case, they then arrange that it shall come in the one market only. It is not always possible to prevent a glut, but co-operation makes its prevention easier by having an agent or agents watching the different markets and directing the supplies to the markets that will give the best returns. By adopting the central packing house, you are certain to get a uniform grade. I would sooner be a buyer than a commission merchant if I could get grade and quality. It is then always a pleasure to handle the goods, and is easier to get good prices for them. The shippers of Texas and Florida have adopted this method with great success. When you get a package of their goods marked with a certain grade, you are certain that the goods will be up to that grade, and we can buy by telegraph with all confidence. A man cannot get a car load of uniform peaches in Canada to-day; we are often asked for them, but find that we cannot quote them, and we have to sell the goods of individual shippers on the merits of that shipment alone. Speaking as a commission man, I would sooner handle the product of such an association at a less percentage than I would individual shipments at a higher percentage.

President Bunting: Mr. Owen did not tell us anything about the method of operation, or how they go about forming such associations.

Q.: What is the usual size of packing houses, and the usual number of graders.

Mr. Owen: It would depend entirely on the amount of fruit you expected to put through. We have a membership of 34 in our association and an acreage of over 1,000 acres of fruit We have 155,000 peach trees, beside pears, plums, quinces and grapes. Our packing house is 55 x 100 feet; that is the main building. It is a two-story building. In the rear we have the basket house, about 30 x 40 feet, where we put our baskets, besides storing them on second floor of main muilding.

We experimented considerably in the building of a packing house, and believe we have arrived at the proper way of constructing it so as to handle the fruit expeditiously. The buildng is located on the railroad track, and on the opposite side, where the fruit is delivered, along the length of the building is a raised platform, and the road is graded up to it so that top of wagon is on a level with floor. The platform is three feet higher than the floor of the building, and is about 25 feet wide. This is for the receiving of fruit. When a grower drives up and delivers his fruit, he is given a receipt for the number of baskets delivered. His fruit is then ticketed and run through the graders separately. In a house of that kind we usually run about seven graders, the capacity of which is one hundred bushels per hour or a thousand bushels in ten hours. When we give the grower his receipt, we retain a duplicate with a stub attached with the different grades and the different sized packages we use. Whatever package his fruit is run into we give him credit for that, and he is given credit for his fruit also according to grade. At the close of the day we pool our sales of the different grades for the day. In case we consign any of the fruit, we hold the average open until we get the returns and then give the member his proper credit, so that each one has a credit for all he puts through. There is no pooling of the whole fruit. If a man grows better fruit than his neighbor, he gets credit for it. We have to consign very little fruit. We find that the commission man will come to us and buy, as he knows he can get what he wants from us. We can supply a car of any given grade of fruit. We have a demand for the cull grades, as well as for the better grades. They will come and buy of us and pay to the extent of twenty cents per bushel more than they will give the individual grower. The expense of operating is pro-rated at the close of the season among the growers in accordance with what each one has contributed. In our case it ranges from seventeen to nineteen cents per bushel. That covers the whole expense, including packages, netting, telegraphing, telephoning (which sometimes amounts to $100 per month) and postage, which is quite an item, because we send out price lists every week to the trade, quoting prices for the coming week and stating what we shall have to offer. Then there are other incidental expenses, such as stationery, printing, the manager's salary, and wages for packing, grading and shipping. All this is combined in that 17 to 19 cents per bushel. The larger the output the less the proportionate expense.

In the matter of baskets, we can go to the basket manufacturer and buy our baskets by the carload, and. as we take a great quantity, we can get them much cheaper than the individual would get them. If we have any complaint to make to the railroad company it is properly and promptly considered, and we have very little difficulty in getting claims through if there is any justice in them at all.

You were speaking of the way of shipping here in Canada, and I was very much surprised at this resorting entirely to express shipments. We use express very little,—only in the early part of the season and for nearby markets ; but we have very moderate rates even then. If you people would come to the idea of using refrigerator cars and get a good refrigerator service you would bring your express companies to terms quicker than in any other way, as you would have an alternate means of shipping and not be dependent upon them.

In the matter of transportation in refrigerators, we load our own cars. They are iced previously by the railway company. We see that they are in proper condition when they leave the packing house. In that way we can ship to all the markets of the country. Our greatest markets are the eastern markets—New York State, Pennsylvania and the eastern seaboard. We pay considerable attention to the smaller shipments to the retail grocery dealers throughout the States of Ohio and Pennsylvania, and also west into Indiana. We handle this trade very successfully, and growers will pay a better price for our goods, getting the fruit fresh, than they will to a commission man or jobber. In fact, we are doing the same business that the commission man is doing, but we are always on friendly terms with him, as we sell largely in carload lots to the jobber and commission man.

Q. Do you have a cooling house ?

Mr. Owen : No ; it is not practicable in handling peaches, to put them in cold storage, except putting them in the refrigerator cars and getting them to market as soon as we can. We aim at getting everything out the same day, but sometimes we have to work all night to accomplish it. Then we have a day and a night crew. In that way we clean up the floor ready for the next day. As a rule the farmer will pick his fruit and along towards evening will commence coming in, and when they are bringing in from three to five thousand bushels a day and the greater part of it in the latter part of the afternoon, we cannot get it disposed of till towards the following morning.

Q. How many hands will it take to do that ?

Mr. Owen : In handling three thousand bushels a day it will take about 30 hands in the different departments.

Q. As to shipping by refrigerator in preference to express ; can you ship in small lots to the retail trade by refrigerator ?

Mr. Owen : Yes ; we can ship a 100-bushel lot, which is our minimum, to move less than a car lot. In almost every small town there is a dealer who will take a 100-bushel car. If it is a smaller amount, it usually goes by express.

Q. What is the maximum distance of your growers from the packing house ?

Mr. Owen : Some haul for a distance of seven and a half miles.

Q. In what condition does the fruit reach you for re-packing ?

Mr. Owen : In very good condition. I wish to refer to our by-laws. In an organization of farmers you must have very binding by-laws to hold them together. We stipulate in our by-laws that the fruit shall be picked in prime condition and delivered promptly. If it is green or over-ripe, or windfalls, or in any way objectionable, it goes into a pool by itself, and the grower will get the credit of it.

Q. Does the manager decide as to this ?

Mr. Owen : It is left to his discretion as a rule. The manager has entire charge of the whole system ; and, of course, he is backed up by the Board of Directors. They are at his call at any time. Speaking of the condition the fruit arrives in, we oblige the grower to pick his fruit in firm condition and of good color, and to bring it in spring wagons. They bring anywhere from 10 bushels to 125 bushels to a load, and the fruit is usually delivered in bushel baskets.

Q. Have you an Act of Incorporation ?

Mr. Owen : Yes, under the laws of the State of Ohio.

Q. Do the growers take any special means in packing to insure safe delivery ?

Mr. Owen : No ; they do not do any packing. All they have to do is to pick the fruit and put it in bushel baskets and deliver it. We then run it through the graders and pack and ship it.

Q. Can you tell us about what express rate you pay for 100 miles ?

Mr. Owen : To a competing point where there are several railways or several express companies we usually have a better rate than to an exclusive point. I can recall one place of probably a little more than 100 miles distance where we have a fifty-cent rate per hundred. They will take ten of our peck baskets, weighing twelve and a half pounds a piece for 100 pounds, which is very liberal, or they will take two bushels or four halves for 100 pounds.

We allow our members to withdraw any time between December and 1st of April. During the rest of the season they are obliged to remain in the company. Any member who sells fruit outside is fined fifty cents per bushel, so as to prevent members competing with their company.

Q. Does the system cover apples ?

Mr. Owen : No, but I do not see why it should not operate in the apple industry, except that, as I understand it, you pack most of the apples in your orchards, but under severe inspection, which you might establish, I see no reason why you should not handle the apple business in the same way and at less expense.

A. E. Sherrington, Walkerton : I am very glad to have heard this paper, as I believe it will entirely change the system of packing apples in this country. It will answer just as well for the packing of apples as for peaches, and perhaps better. The apples can be placed in a barrel in the orchard just tight enough to convey them successfully to the central packing house for repacking, and the brand placed upon them there. We are working co-operatively in our section ; we have between fifty and sixty members, and turn out between three and four thousand barrels of apples, but each member packs and grades his own fruit. In that way we get a diversified grade, and we have difference of opinion as to what grade the fruit should take, and also different qualities of apples in our orchards, which gives some difficulty. A central packing house would overcome that. I have been thinking along these lines myself, and am perfectly satisfied that we could so reorganize our Association that we should be able to run a central packing house. The people in our vicinity at the present time are just waiting to see how we close this season's business. If it is successful, as it will be, they will be ready to unite with us. The only fear I have is that it will grow beyond our management. There is a great advantage in co-operative work, especially in regard to handling apples. Large quantities of apples are grown in our district, but under the old system, where the fruit was bought in the orchard by the buyers, it was picked and often left on the ground for weeks, where it deteriorated to a very great extent. This difficulty would be overcome. This year we found that through co-operation we had no apples going to waste upon our hands, but were able to place them all upon the market, and realize something for them, thus utilizing varieties that in other years had been allowed to go to waste.

Wm. Rickard, M.P.P.: There are unquestionably great advantages to be gained from the co-operative packing of apples. But what strikes me is this, can we satisfy all the growers by having them bring their fruit to a central packing house to be packed and graded ? If all had good orchards and lots of good fruit, it would not be so difficult. As it is, one man's apples would be worth much more than another man's, and that might lead to dissatisfaction.

Mr. Sherrington: There might be some difficulty in this respect for the first year or two, but I don't think there would be after that. If we could put our apple-growing industry on a more paying basis, the men who now grow poor quality would become interested in their orchards and soon produce a better quality. There is no doubt that, at the present time, we have growers who are producing a better quality of fruit than their neighbors, but there will be a number of those in a district who are growing number one apples. Their fruit will grade pretty nearly alike, and will be shipped alike as a certain grade. The men who are growing poorer fruit will have it graded as No. 2, and it will be sold together.

Q. But they may not think as you do about it, and will not be satisfied!

Mr. Sherrington: But we shall have by-laws, and if they will not abide by them they must step down and out.

W. A. MacKinnon: This brings us to consider a very important phase of the subject, and that is the limits of co-operation. Is there any reason why the movement should end with the shipment of the fruit? Why should not an association of this kind instruct the grower in the cultivation, pruning and spraying of his trees, and so reduce to a minimum the poorer grades of fruit? We have had during the past few years a great deal of correspondence in reference to the second grade of apples under the Fruit Marks Act. The second grade is not defined, and there is a demand for a definition. I think this Association should have a voice in deciding what a second grade apple is. If you are silent, others will probably get their way. I think this is a subject for a committee, and that one should be appointed to consider this definition.

G. C. Caston: This will be a very difficult matter to settle. It will be a comparatively easy matter to settle a No. 2 grade in some classes of apples, but it is very difficult in such varieties as the Fameuse, Northern Spy, Baldwin, etc., which vary very much in different sections of the country. But I agree that it ought to be done, as people all over the country are asking what a No. 2 apple is.

At the request of the meeting, the President named the following as a committee to consider the definition of a No. 2 grade, and to make a recommendation upon the subject: Messrs. E. D. Smith, Elmer Lick, A. McNeill, W. H. Dempsey, A. E. Sherrington.

REPORT OF THE TRANSPORTATION COMMITTEE.

By G. C. Caston, Craighurst.

The transportation question is one of the most important that we as fruit growers have to consider. The industry is constantly growing. This Association has done most valuable work in the past, and its energies could not be directed to any question in the future that would benefit the fruit growers more than a satisfactory solution of the transportation problem. As you are aware, a committee was appointed last year to take up this matter and to wait upon the transportation companies, and upon the Dominion Government, along with delegates from other Associations, with a view of securing the appointment of a commission to investigate this whole question. Your committee did its share, I think, in bringing influence to bear upon the Government and in presenting the grievances of their fruit growers in such a way as resulted in our receiving a promise that such a commission would be appointed. When that commission is appointed the next step will be for us to make as strong a presentation of our case as possible. It is of no use going before the commission unless we have a strong case. You will have noticed that within the past few weeks the Manufacturers' Association has appointed a railway expert to represent them before the Traffic Association. It has occurred to me that perhaps we might secure a share of this man's assistance.

I think we might also obtain the co-operation of the local fruit growers' associations, some of which are doing good work in this direction.

At a meeting of fruit growers representing the Ontario Fruit Growers' Association, and the Niagara District United Fruit Growers' Association, held at St. Catharines on the sixth day of June, the following resolution was presented and unanimously endorsed by all present.

Moved by S. M. Culp, Beamsville, and seconded by James Titterington, St. Catharines, and resolved: "That it is the opinion of this joint meeting of representative Fruit Growers of the Ontario Fruit Growers' Association and the Niagara District United Fruit Growers' Association, that, in view of the probable heavy output of fruits during the coming season, the time is opportune for a considerable reduction in the rates of carriage that are now charged by the express companies of this country; that, in fact, if a reduction be not made, the shippers of this district will be forced to make more extensive arrangements, whereby the large proportion of their shipments will be sent forward by the freight department under refrigeration, a system which in the past few years has proved very satisfactory. It is considered by this committee that a reduction of at least 25 per cent. on present rates should be made to equalize the express rates with those prevailing by freight. This would mean a rate of 10c per eleven-quart basket on shipments to Ottawa and Montreal ,as against a rate of 5½c by freight.

"It is submitted that a charge of 13½ cents per basket on fruit selling around 25 cents and upwards per basket in Montreal is out of all proportion, and if not reduced will result in a large amount of traffic being diverted to other channels, or in the fruit being left to rot in the orchards of the country.

"It is also suggested that in case the express companies comply with the request of the meeting that there is no doubt that conditions will be such as to necessitate preparations being made for a largely increased business during the season of 1903."

The question of a proper refrigerator car service is closely connected with that of transportation. Most of you know how the California fruit is handled. The growers there can get whole trains made up which travel at express time through the country and land shipments in distant countries in good condition.

The following is a letter I have received from G. B. Robbins, with reference to the refrigerator car service in California:

Chicago, May 2, 1903.

G. C. Creelman, Secretary, Toronto, Ont.:

Dear Sir,—As you may be aware, we are large owners of combination ventilator-refrigerator cars, and handle a large portion of the shipments of fresh fruits, berries, etc., of this country shipped under refrigeration.

Our plan of operation is to furnish suitable cars and attend to the initial icing and reicing of same en route, for which refrigeration service we charge a reasonable profit, in addition to the cost of the ice.

We also furnish to some extent cars for shipments of apples and other fruits, etc., under ventilation, but not requiring refrigeration, or, in cold weather, for shipments requiring protection from frost, our cars being built to withstand an outside temperature of zero or a little below. Such shipments under ventilation or for frost protection, however, we only furnish equipment for in case the runs are of sufficient length or the service active enough that the cars will make good earnings for mileage, or upon payment of some bonus by shippers for the use of the cars.

We handle practically all of the summer green fruit from California and most of their oranges, as well as all the Florida berry, vegetable, orange and pineapple shipments, and practically all of the strawberry business from the Atlantic Coast Line, Delaware, Tennessee, Missouri, Arkansas, etc.

We understand you are most familiar with the business of this character originating in Ontario, and if there is a demand for a service such as above outlined, we will thank you very much to give us some particulars in regard thereto, including volume and nature of shipments under refrigeration, territory in which they originate and move to, and time of movement, and same information with respect to ventilated shipments or those requiring frost-proof equipment.

Yours truly,
Fruit Growers' Express.
By G. B. Robbins.

Chicago, May 28, 1903.

Mr. W. H. Bunting, President Ontario Fruit Growers' Association, St. Catharines, Ont.:

Dear Sir,—Yours of May 25th. Without more definite information, we do not see how we can go into the subject more definitely than explained in our letter of May 2nd, except, perhaps, to say that our charge for any highly perishable shipments under refrigeration would be from $15 to $20 per car, in addition to the cost of the ice, and our cars take more ice than most railroad refrigerators. It is therefore plain that our service would be desirable only in case the service in the railroad cars has proven inadequate or unsatisfactory, as in the case of shipments from most warm districts in this country. Possibly we may not make much headway in the matter until we are able to send a representative to personally canvass the situation, which we may not be able to do until next winter, as our men are very busily employed in other shipping sections until that time.

Yours truly,
Fruit Growers Express,
By G. B. R.

President Bunting: It has struck me very frequently in connection with this question that we as growers speak in a general way of the difficulties under which we labor, but when it comes to getting down to actual facts and endeavoring to bring something tangible, something that will carry weight, before the people with whom we have to deal, I have found great difficulty in securing assistance and co-operation from my brother fruit-growers. We either have a grievance in connection with this matter or we have not. If we are suffering under a disability, it seems to me that it is the bounden duty, not only of those officially appointed, but of every member of our Association, to do all he possibly can to strengthen the hands of those who are endeavoring to secure relief During the past two or three years I have had an opportunity of representing you before some of the railway corporations. I may say that we have always been received courteously, the representations we have made have been attentively listened to, and we have secured some concessions. We have been able to make out a fairly strong case, but, owing to the fact that the fruit industry has always been looked upon by the transportation companies as one that deals in what they consider to be a luxury more than a necessity of every-day life, and, therefore, one upon which they have been accustomed to levy some of their most profitable rates, it is a difficult matter to disabuse the minds of these officials of that fact, and to bring them to look upon the commodity in which we deal as one of the ordinary necessaries of life. They do not realize that during the last few years we have been obliged to sell our fruit on a par with other agricultural products. Until we can make the transportation companies realize this, we shall not get the service and the rates which we feel we are entitled to. The Chairman of the Traffic Association, Mr. J. Earls, gave me to understand that the fruit business was an express business solely; that it was something that required extreme care in handling and special accommodation, and in consequence necessitated a very much higher rate than almost any other commodity. This is not correct. It is true that we require our goods to be carefully handled, and we certainly require that they should be promptly handled; but the railway men overlook the fact when they handle our goods promptly, they get the use of their rolling stock again so much the sooner. I may say that your committee felt that, in view of the negotiations that were under way for the appointment of the Railway Commission, perhaps very little could be done during the past year, so far as the transportation companies were concerned, but the time has now come when the case we ought to present should be got together and made as strong and forcible as possible. I trust that every member will add his quota to the information.

In reference to the resolution which the Chairman of the committee read as to the effort made last year in connection with the express companies, I might say that the companies took no action whatever. I understand, however, that in some sections arrangements made by co-operation have succeeded to a large extent in doing away with some of the difficulties which were met with in freight transportation. Through co-operation we have succeeded in St. Catharines, and at some other places, in securing better rates by assembling our fruit in carload lots. But the express rates are altogether out of proportion, and in that matter we must have relief. In connection with freight shipments, the volume is getting so large that I have no doubt representations can be made that will secure relief in that respect.

L. B. Rice, Port Huron, Michigan: I should like to ask the committee if they, in looking for transportation to the Northwest, have taken into consideration the line of steamers that leave Sarnia every third day, as a means of carrying their fruit in that direction. Our boats that bring down freight go back practically empty, and are only too glad to get freight at almost ballast prices. I think that apples have been carried back as low as five cents a barrel from Port Huron to Duluth. These vessels go to the Canadian "Soo," Port Arthur and Fort William and then to Duluth. It seems to me that this would be a means by which you could ship cheaply to the Canadian North-west, which ought not to be overlooked.

G. C. Caston: Our Canadian boats mostly go back loaded up to Port Arthur. The difference in rates amounts to eighteen cents in favor of the lake and rail route, but then there is the double handling.

Mr. Rice: They may say that they go back full, but I am inclined to doubt it. I would not think of suggesting it for growers who have a long haul to the lake port, but for the western part of Ontario I think it would be a good idea.

Mr. McNeill: I think that the people of Essex County have here an opportunity of developing the fruit industry that they are not taking advantage of. This great Northwest trade is practically ours. Speaking as an Essex man, I hope the fruit growers of the locality will appreciate that. Early apples have been a drug in the market in this country for a long time, but the time is coming when they will be a most profitable fruit, and in that case there will be no better shipping point than Windsor.

In reference to the transportation question, we apparently have not done much, but it is only by pounding at it continuously that we can hope to succeed, and we must not relax our efforts simply because we have no tangible results to show. Our grievances are perfectly definite, and I mention them so that it may not be said that we have not positive grievances.

We want, first and foremost, a change in the classification of several fruits. We want apples removed from class five and placed in class eight. Nothing could be more definite than that, and we can produce the best of reasons to show that we ought to have this reduction in classification.

Second: We want different arrangements in regard to mixed cars. We want the privilege of consigning different fruits in the one car, if need be, and we have the best of reasons for wanting it.

Third: We want better local rates. There is a good deal of moving of fruit for short distances, and the rates are extortionate. I have found instances of this everywhere For the ten miles, for example, from Creemore to Collingwood the rate on cull apples is fifteen cents per hundred. We want a lower rate on cull apples. We want a rate corresponding to the rate on sugar beets. I got a rate of forty cents a ton for almost any distance on my beets. I sent them to Rochester, Michigan. Why should not our cull apples get a corresponding rate? They are no more trouble than beets. It would enable us to save some few of the hundreds of thousands of barrels that now go to waste.

Next, we want lower express rates to correspond with the rates they get on the other side of the line. There is no reason why they should be so high. I would simply make a plain demand that these rates should be cut in two without beating about the bush.

Next we want a better refrigerator car service. The scheme spoken of by Mr. Caston should be introduced here, and it would have been introduced if it had not been for the greed of the railway. The company operating in the States has thousands of cars and places them wherever they are wanted. There is a central office that keeps a view of the trade of the whole country. Where there are thousands of cars wanted in any given district they send their cars to that district. In this way they transport the fruit product of the district They commence operations in the south, and as soon as that crop is moved, they move their cars farther north, and then farther north again. Then the return process begins, and they take the fruit crop from the north and move it south again. By doing this on a large scale they are able to give accommodation to the fruit men that no system of railroads, operating independently of each other, could hope to give. We want the same system in operation here. They want the railway companies to let in these cars, cars that are doing nothing at this particular time, and the company owning them would be only too glad to give us the service.

Next, we want better accommodation at our stations. That alone would very soon pay for the erection of freight sheds. I enquired of Mr. Sherrington whether they had such accommodation as their Association deserves. I went up there lately and found that they were obliged to load their cars right at the open platform. When dinner was called I had several barrels of apples open which I was inspecting. I asked the station master for accommodation for these barrels while I went to dinner, and he could not or would not give it, and refused to be responsible for them. This is the case all over the country. I was at a station last year where there were three carloads of apples standing in the yards exposed to all the inclemency of the weather. These apples went to the old country, and no doubt the greater number of them were slack. That is the principal cause of so many slack apples in the old country. The fruit growers are blamed for it on the other side, and it injures trade.

We also want some proper means of tracing cars. On most well equipped roads on the other side, if you despatch a carload of stuff, the officials can tell you just where that car is at any stated time, and you can inform yourself of the progress of the car from day to day ; but here we have not the slightest idea where a car is until it turns up at its destination.

W. L. Smith, "Weekly Sun," Toronto : There is a National Farmers' Congress in the United States in which all farm organizations can be united for the purpose of securing united effort for the attainment of common ends. We have here, in the Farmers' Association, the nucleus of a like organization. Here is the germ of an idea which may be developed into a comprehensive scheme of union. Why should not the Dairymen's Associations, the Live Stock Associations, the Fruit Growers' Associations, and all other like organizations have accredited delegates to the Farmers' Association ? Such a union would be all powerful in regulating freight rates, in urging the carrying out of Dr. Mills' idea for the creation of a national express service, and in making the influence of farmers felt all along other lines in which there is union of interest.

H. W. Dawson : I do not know that I can say any more than I have previously said upon this question. There is no commodity handled by the railroads that pays a higher rate than fruit, and none that gets less accommodation for the money paid, and there is no commodity for which the railways are having so much increased carrying. Mr. Smith strikes it right when he says co-operation is needed. In the past you have presented your case, but have not followed it up. Take the Millers' Association ; when they want a cut in rates, they do not stop at the one interview, but follow it up until they get it That is what the fruit men should do.

E. D. Smith, M.P.: There is no doubt that the fruit growers have a great grievance. We find that other interests in the community can get redress, why should not the fruit growers ? Hitherto I have felt that we were to some extent helpless, and that it was more or less a waste of time to approach the railways in the matter, but now we are to have a Railway Commission, and, as Mr. Smith has suggested, if the different organizations could combine and send representatives to wait upon that commission, we shall be able to present our grievances in such a way as to command attention. Now, as to the personnel of this commission. The commission is to consist of three men. If two of these men should be representatives of the railways, we shall not be in any better position than before. This is one of the great dangers, and I think that the first effort of farmers and fruit growers should be to urge upon the Government the necessity of placing at least two men on the commission who represent the producers of the country. I think there will be at least one representative farmer. The farming interests of this country are the paramount interests. The railways make their profits largely by carrying the products of the farms. Therefore, the farming interest.

powerful and important as it is, should be represented on that board by at least one man. This matter is not settled yet, and I think we should devote our attention to it first of all. Then let us send a strong delegation from the different farmers' organizations to press our claims. There is no doubt that fruit is discriminated against. Some of the local charges are simply outrageous. I shipped ten barrels of apples the other day from Port Perry to Almonte, not over 100 miles, and it cost me seventy-five cents per barrel. It would only cost nineteen cents a barrel more to carry those apples to Liverpool.

Mr. McNeil : I shipped two barrels this morning to Walkerville, thirty miles away, and paid just twice the rate that I could ship to Montreal for.

Mr. Smith : One of the greatest grievances we have is the inexcusably long time they take to deliver goods. I have known a car take thirty days to reach Winona from Owen Sound with a load of baskets, and two weeks from my place to Nova Scotia. There is no real excuse for this. In England a freight train will start from any point at six o'clock at night and deliver its freight at Manchester before daylight next morning. I have an agent in Manchester who tells me that for twelve months in succession that train had arrived within thirty minutes of the same time every morning. Their rates are little, if any, higher than ours, and they carry their goods by freight almost as fast as they are carried here by express. If I wish to ship goods from my place to Petrolia on the Michigan Central, where there is no express service, I ship in the afternoon, and they are there on the following morning. This is the greatest grievance I have against the companies—the length of time they take in transportation.

F. J. Barber, Georgetown : While we may not be able to afford to engage a fruit expert to assist us in our dealings with the railways, I think that if all the associations were to unite on the plan outlined by Mr. Smith, the combined expense of employing an expert would not be great, and our interests would be properly looked after.

Mr. Caston : Mr. Smith's remarks suggest another question, and that is the personnel of the commission. Do you think that we as an Association should take action in that connection ? If so, it is not too late, but it is not any too early. A great deal will depend on that. Should we appoint a committee of men who are sufficiently well versed on the subject to make a strong enough case before the commission, and, if not, should we do as suggested and co-operate with other societies and have an expert representative ?

The President : As to the composition of the commission, when it was first talked of, it was generally supposed that it would consist of five members, and efforts were made looking towards the representation of the fruit men on the commission. It was decided, however, to confine the commission to three, and under those circumstances, a representative of the fruit industry was no longer possible. The idea of co-operation brought out by Mr. W. L. Smith appears to me to be correct with the view of securing one, if not two, commissioners who shall be in touch with the farming interests of the country.

A Member : There is very little use in telling our grievances ; we want to formulate them and then see that the matter is properly presented to the commission by the best talent we can employ.

Robert Thompson : I think we should be careful not to make any statements that can hardly be considered fair, as they only weaken our case. In referring to the cost of transportation to local points in comparison with Montreal, in one case the rate is for car lots and in the other for small lots.

Mr McNeill : I think I am partly to blame for this, and I have to apologize. I only wished to show how absurdly high the local rate was.

On the motion of A. McNeil, seconded by L. Woolverton, the following were appointed a Committee on Transportation :

Messrs. W. H. Bunting, St. Catharines ; R. J. Graham, Belleville ; H. W. Dawson, Toronto ; D. D. Wilson, Seaforth ; W. L. Smith, Toronto ; D. J. MacKinnon, Toronto ; J. M. Shuttleworth, Brantford.

It was moved by F. J. Barber, seconded by R. L. Huggard, that Messrs. A. McNeill, W. H. Bunting and Murray Pettit be a committee to co-operate with delegates from other Agricultural Associations in the redressing of grievances common to the agricultural interests of the country. Carried.

REPORT OF COMMITTEE ON RESOLUTIONS.

Mr. McNeill presented the following resolutions on behalf of the Committee on Resolutions:

Growers' Co-operative Organizations.

That in the opinion of this Association, the future development and continued prosperity of the fruit growers of Ontario depends on the formation in every fruit district, where such does not now exist, of a Growers' Co-operative Organization for the purpose of handling fruit and buying supplies in a co-operative way, and for the further purpose of bringing the united influence of all to bear with a view of securing better transportation facilities in the interests of all.

"That for the purpose of developing such organizations, a committee be formed charged with the duty, acting in unison with the local directors, of promoting the work of the organization during the coming winter, and that the President be charged with the special duty of attending meetings called by the local organizations for the purpose of assisting and completing the work of organizing.

"That, the Organizing Committee shall consist of G. W. Cady, Leamington, for the western district; Robert Thompson, St. Catharines, for the Niagara district; A. W. Peart, for the Burlington district; A. E. Sherrington, for the northern district, and Wm. Rickard, M.P.P., for the eastern district.

"And further, that the Executive be instructed to provide funds to meet the necessary expenses of those named while carrying on the work assigned to them."

On the motion of Mr. McNeill, seconded by Mr. M. Pettit, the same was adopted by the Association.

Encouragement to Canning Industries.

"That whereas, during the season just passed, thousands upon thousands of baskets of tender fruit rotted upon the ground, while in Great Britain, and even in our own country, an ample outlet, at profitable prices, could have been obtained for the same had sufficient means existed for the bringing together more closely producers and consumers.

"That whereas, to provide for this bringing together, it is necessary that the bulk of these tender fruits be reduced to preserved form as near the point of production as possible.

"That, whereas, one of the main difficulties in the way of securing complete development of this canning and preserving industry lies in the cost of raw materials, other than fruit, the chief of these other raw materials being sugar and packages for holding the preserved article.

"Therefore, be it resolved, that this Association respectfully but most strongly urges the Dominion Government to extend to the canning industry of this country the same system of aid already extended to other industries, by enabling them to buy their raw materials at the lowest possible cost, and that to this end the duty on sugar used in canning, and on packages used for holding canned fruit be remitted.

"And further, that the Dominion Government be petitioned to secure the enactments of legislation compelling the labelling of all canned preserves in such a way as to show what the canned goods actually consist of, as demonstrated by official analysis; and further, that such goods be distinctly labelled, "Made in Canada.'"

On motion of Mr. McNeill, seconded by Mr. Woolverton, the foregoing resolution was adopted by the Association.

Mr. Woolverton: Since Mr. Moore is here representing the Department at Ottawa, I think it would not be out of place for me to introduce the matter of ocean transportation in cold storage, so as to give him an opportunity of speaking. I have been making a good many shipments of Bartlett pears to the Old Country, and not altogether with success. We all want to know exactly where the difficulty is, whether with the refrigerator car service or with the refrigerator service on the ocean. I may say that in some instances the cars furnished us at Grimsby have been very excellent, and would, I am sure, transport the fruit safely; in other instances the cars have been very bad, and entirely unfit for such a service.

In a recent issue of the Horticulturist I referred to a shipment of pears made on the S.S. Lakonia. On September 18 the consignee in Glasgow wrote me as follows:

Glasgow, 18th Sept., 1903.

L. Woolverton, Esq., Grimsby, Ontario:

Dear Sir: I beg to send you herewith account sales for your consignments of pears ex S.S. "Lakonia," also statement of account and draft for £191 10s 8d sterling in payment of same, which please acknowledge. As I cabled you to-day, a percentage of these pears landed here in very bad condition, and this I understand was due entirely to the temperature having been kept too high while they were on board the steamer. It appears that the refrigerator chambers were packed full of fruit, and therefore, the cases in the centre of the chamber were blocked out from the air, and it was impossible for the engineer to keep the temperature down sufficiently. The pears were carried at a temperature of 44 degrees to 46 degrees, and I have asked Mr. Brown, the Government Inspector here, whom you saw while you were in Glasgow, to write you on the subject, as he is making a full report thereon to the Government. Some of the cases of pears were in perfect order, and sold remarkably well, but others again were in ripe and over-ripe condition, and it was utterly impossible for us to check them all here, and after the cases were sold we had numerous complaints from customers as to their having got ripe pears instead of green, and we had, therefore, to make allowances to the buyers. You will see the different prices which we had to put the pears in to the purchasers, whereas had the fruit been all in green condition, and take your own consignment as an instance, the A No. 1 would have realized 8s, and the No. 1 6s 6d, but, as explained above, those ripe and over-ripe had to be allowed for. I can assure you we did our very best in your interest under the circumstances, and feel confident that should your next consignment land here in green condition, we shall be able to do well for you. It is a great pity indeed that these pears were not carried at a lower temperature, say from 36 degrees to 38 degrees, as then they would have been in good condition, and the result overhead would certainly have been more satisfactory to all parties. I thought it better when cabling you to-day to let you have the information that the fruit was carried at a high temperature, so that you could fix the matter up with the steamship company, and arrange that future lots be carried at a right temperature. The fifteen boxes of peaches which you shipped were just a mass of decayed fruit, and could not be offered for sale at all. I have also to state that the pears would have looked better if they had been wrapped in paper, and I have no doubt your further shipments, if attended to in this respect, and landed in good order, will turn out satisfactorily. I note from your favor of the 5th that you are shipping by steamer "Sicilian" two carloads, and you can depend on it we shall give these every care and attention, and do all in our power to realize best prices therefor. I am also glad to learn from your favor of 3rd that you have secured Mr. Vandyke as a shipper and that this gentleman has nearly 3,000 barrels which he will forward, and we trust that this is only one of the number of shippers which you will be able to secure. We are advised of a consignment from Messrs. A. H. Pettit & Sons, which they say is coming forward by steamer "Alcides," but we have no advice from you in regard thereto, and it is possible these apples will be in the "Sicilian" along with your other consignments. We had a letter from our Mr. Russell, wherein he mentions that there is a large quantity of third-class apples in your district, suitable, perhaps, for preserving purposes here, and we have been making inquiries at all the preserve makers, and regret that they cannot do with these apples, as they have already contracted for nearly their full requirements for the season. I cannot recommend you to ship this third-class grade of fruit, as there would be practically no demand for it here, and if left to the mercies of the preserve makers on this market, they would be inclined to give very little for it, and I am certain it would not pay freight and expenses. I have only to add that there was a strong demand here for the pears ex "Lakonia," and it is disappointing to a great extent that there was such a percentage of ripe and over-ripe fruit, and this may tend to have an adverse effect on next lots; but we shall, of course, examine and show the fruit to the purchasers in such a manner as to retain their confidence and secure their support throughout. I may add that I understand there were some California plums packed in the same chamber as these pears also landed here in bad condition, and the Donaldson Line people should not have put such a great quantity of fruit into one chamber, and should have left air passages so that the temperature could have been kept at a right degree.

Without more, meantime, and waiting your further valued favors,

Yours faithfully,

THOMAS RUSSELL.

About the middle of September I shipped a second consignment by the Allan Line steamship Sicilian. It arrived in such a state that very few of the pears could be sold in Glasgow to bring any money back to me. The following is a copy of a comparison between the chief engineer's log and the thermograph record sent me by the consignee in Glasgow:

Date.	Chief Engineer's log.	Thermograph.	Date.	Chief Engineer's log.	Thermograph.
Sept. 16th	48	60	Sept. 23rd	34	37
Sept. 17th	46	50	Sept. 24th	35	37
Sept. 18th	42	44	Sept. 25th	33	37
Sept. 19th	41	41	Sept. 26th	35	36
Sept. 20th	40	39	Sept. 27th	36	36
Sept. 21st	40	38	Sept. 28th	35	36
Sept. 22nd	39	37			

From this it appears that on the day the fruit was loaded the temperature in the chamber was 60 degrees F., and that it was four days before it got down to 41 degrees. I submit that the condition of affairs revealed by this statement makes the shipment of our tender fruits entirely out of the question. In isolated instances, where the temperature has been kept at about 33 degrees, peaches and pears have been successfully shipped. A gentleman from this centre did succeed in getting a shipment over, and received a return of $3 per bushel. I had a similar result myself from one lot that carried in good condition. They were sold at $3.75. This shows the possibilities of the trade and what an important matter it is to us fruit growers that we should have conditions, both on the railways and on the steamship, to enable us to put our fruit where it will bring the most money. If there is any way by which the Department of Agriculture at Ottawa can help us, and make it possible for us to secure a certain temperature on the steamships, it would mean a great deal to us, and I shall be glad to learn what the possibilities are in this direction in the near future. It matters a great deal to us, because it must to a certain extent govern us in our planting, and it is a long time before we can adapt our orchards to export trade. We want to know, therefore, whether it is ever going to be possible for us to carry our tender fruits to the markets where they will bring us the most money.

OCEAN TRANSPORTATION.

By W. W. Moore, Government Inspector at Montreal.

In the case of the "Lakonia" shipment of the 3rd September last, there is no doubt that the fruit in her refrigerators was carried at a higher temperature than is desirable, the lowest temperature recorded by the thermographs during the voyage being 41 degrees. When her refrigerators were opened at Glasgow it was noted by our Inspector that the cases were very closely stowed, thus making it difficult for the cold air to penetrate to the centre of the chambers. He drew the attention of one of the members of the Donaldson S.S. Company to the close stowage, and urged upon him the importance of having dunnage between the tiers of packages in order to facilitate the circulation of air within the chambers. Upon receipt, by the Department, of our Glasgow Inspector's report, we at once took up with the Montreal agents the question of proper stowage of fruit in cold storage chambers, and as a result of the representation made by the Department, on both sides of the Atlantic, the "Lakonia" on her next voyage had the two after chambers specially fitted for the carriage of fruit Battens were laid cross-wise on the floors of the chambers, and strips 3-4 of an inch thick were placed between each tier of cases. Six ventilating trunks were also put up in different parts of each chamber. Thus fitted, she sailed from Montreal on October 15th with about 1,000 cases pears and about 3,000 cases boxed apples, all in cold storage. This fruit was landed in Glasgow in splendid condition; but I want to emphasize the fact that it first went aboard the steamer at Montreal in excellent condition for shipment.

The S.S. "Sicilian" Shipment.

On the voyage in question this steamer left Montreal on Sept. 17th, with 2,000 cases California plums, 1,000 cases California pears, and 1,144 cases Canadian pears, all stowed on the port side refrigerator. The Canadian pears were from the following shippers. E. D. Smith, through Hart & Tuckwell, 402 cases; L. Woolverton, 742 cases. Mr. Woolverton's shipment arrived at Montreal in refrigerator car on Sept. 9th (eight days before the steamer was advertised to sail), and was delivered on the 10th to the Union Cold Storage Co.

Mr. Carey, Dominion Fruit Inspector, examined Mr. Smith's pears on the 15th, and reported re condition as follows: "I did not count fruit, but in my opinion about 50 per cent. were ripe or showing yellow color." Mr. Smith's shipment was also reported by Mr. Morrison, Cargo Inspector for the Department of Agriculture, Montreal, and by Mr. Woodard, Official Referee, Butter and Cheese, Montreal. The former reported "about 50 per cent. ripe," while Mr. Woodard wrote: "There is no question but what Mr. Smith's fruit was over-ripe before leaving this side, and should never have been sent.'

Regarding Mr. Woolverton's shipment, Mr. Morrison reported that on the 15th the pears were in "fair condition, some over-ripe,' while Mr. Woodard's report reads: "One lot marked 'L.W.,' about 25 per cent. ripe; another lot marked 'L. Woolverton,' about 45 per cent. ripe."

The loading of the pears and plums into the port chamber was commenced about 2 p.m. on Sept. 15th, and was continued until the chamber was filled. The Department's thermograph was placed in the chamber as soon as the fruit began to go in, and the chart shows a temperature of 47 degrees at 12 o'clock that night. Beginning with Wednesday, the 16th Sept., the highest and lowest temperatures in each 24 hours during the voyage, as recorded on the chart, were as follows:

	Highest.	Lowest.
Wednesday, Sept. 16	46 deg.	39 deg.
Thursday, Sept. 17 (sailed)	41 deg.	40 deg.
Friday, Sept. 18	39 deg.	38 deg.
Saturday, Sept. 19	39 deg.	38 deg.
Sunday, Sept. 20	37 deg.	37 deg.
Monday, Sept. 21	38 deg.	35 deg.
Tuesday, Sept. 22	36 deg.	34 deg.
Wednesday, Sept. 23	35 deg.	33 deg.
Thursday, Sept. 24	34 deg.	31 deg.
Friday, Sept. 25	33 deg.	30 deg.
Saturday, Sept. 26	33 deg.	31 deg.
Sunday, Sept. 27	34 deg.	31 deg.

Monday, Sept. 28—vessel arrived at Glasgow.

Considering the ripe condition of a large portion of the Canadian shipment, as established by the reports of our Inspectors, and the consequent difficulty in cooling the fruit quickly, it must be said in all fairness to the steamship company that the above record is a very creditable one indeed.

When the cold storage fruit was discharged at Glasgow, it was examined by our Inspector, Mr. Brown, who reported as follows:

"Nearly all the Bartlett pears were practically useless. They were carried along with 2,000 cases plums and 1,000 cases Californian pears. The plums were in splendid condition, and the Californian pears were also good, with the exception of some B. Hardy's, which were sleeping.'

It should be noted that the Californian fruit turned out in good condition, although the Canadian fruit, carried in the same chamber and at the same temperature, turned out in a worthless condition.

In his details of each particular lot, Mr. Brown writes:

"E. D. Smith—These were all Bartlett pears, all of which were nearly useless."

"L. Woolverton—742 cases pears and 147 cases apples, all in cold storage. The pears, principally Bartletts, were in a very wasty condition, the fruit evidently having been too ripe when shipped. Several small lots of Flemish Beauty arrived in good condition, fruit being firm and green. The apples in the cases were very good."

Now, these reports from which I have quoted were made by men both competent and disinterested. and their evidence touching on the condition of the fruit, together with the thermographic record for the voyage, establishes. conclusively, to my mind at all events, that the bad condition of the Canadian pears ex the "Sicilian" was not due either to faulty cold storage facilities on the steamer or to lack of attention on the part of the ship's engineer. While I hold no brief from the steamship people, and am not here to defend, or apologize for, any of their sins, whether of omission or commission. yet facts are facts, and the only way in which those occasional failures in the shipping of tender fruits can be avoided is by first determining just where the fault really lies, in order that the proper remedy may be applied. Some people would have us believe that our ocean cold storage system is very defective. No doubt it can and will be improved, because every year great strides are being made in the science of mechanical refrigeration, but if the cold storage facilities on the St. Lawrence route are inadequate, how is it that American shippers send so much of their early fruit via Montreal, seeing that they have a choice of routes? This year, up to Nov. 20th, the number of packages of tender fruit shipped from Montreal in cold storage was as follows:

Canadian pears	9,337 cases, 27 half barrels.
United States pears, plums and peaches	9,950 cases.
Total	19,287 cases, 27 half barrels.

Mr. Woolverton: Can you explain why there is such a difference in our records. I have here the chief engineer's log and the thermograph record?

Mr. Moore: Where did you get the thermograph record?

Mr. Woolverton. From the consignee.

Mr. Moore. I have the official record taken from the machine. There is nearly always a difference between that and the chief engineer's thermograph, because it is in a different part of the chamber, namely, about the centre of the ceiling, where it would be warmer. The readings I am giving are from the official chart.

Q.: Were there not several thermographs on the ship?

Mr. Moore: One in each compartment.

Q.: Is it not possible that Mr. Woolverton's record was taken from another thermograph?

Mr. Moore: That may be.

Mr. McNeill: Was this thermograph unlocked in Great Britain?

Mr. Moore: No, it was not.

Mr. McNeill: It would be impossible for the consignee to get the record then.

Mr. Moore: Our agent over there has the keys, and he sometimes opens the box and looks at the charts, but never takes them off.

Mr. Woolverton: Then, doubtless, it was obtained in this way.

Mr. Wilson, London: I think I saw it stated in the Horticulturist that in these pear shipments the wrapping of the fruit was omitted. All delicate fruit should first be wrapped in thin wax paper, and then wrapped again in ordinary tissue or thin Manilla paper. The air between the papers will act as a non-conductor, preventing condensation taking place, or injurious gases or germs reaching the fruit.

E. D. Smith, M.P: In reference to these shipments of pears, it is only fair to say that my pears, as well as some of Mr. Woolverton's, were detained in Montreal. I think I know how to pack pears hard enough for the old country. I have shipped some cars with the greatest success. The shipment I refer to left in the best condition possible but they arrived in Montreal, owing to the delay of the railway company, a little too late for the boat. I had sold them to a man in Montreal, but he refused them on that account, as he did not want to take the risk of holding them over for another boat. I therefore ordered them to be sent at once to cold storage, where they were for three or four days. They were shipped from Montreal seven or eight days after they left my place. On hearing Mr. Moore's report, one would certainly think that the fault lay somewhere else than on the steamer for their not arriving in good condition, especially as the inspector states that the pears when placed on the steamer were over-ripe. But I also have the report of my agent in Montreal, who examined the fruit when it was first taken from cold storage. I authorized him to examine the fruit, and do whatever he thought best with the shipment—to ship to the old country if they were in good condition, otherwise to sell the consignment in Montreal. If they had been sold in Montreal, the agent would have made a commission, but, notwithstanding this, he concluded to ship to the Old Country, consigning them to Thos. Russell, a responsible firm, who sent their returns to me. My Montreal agent reported that the fruit was hard and green, and in excellent condition, and I can see no object in his telling me this if it were not the case. It is possible that he examined different packages to those examined by the inspector. At any rate, the result of the shipment was a debit charge of twelve pounds.

If I had not got the thermograph record from the steamship people as well as from the Department, I might still think that my agents in Montreal were mistaken as to the condition of the fruit, but here I have not only the engineer's record, but the thermograph record kept by the steamship people. This was sent me in reply to a complaint and demand for damages. Now, the Department's thermograph record gives the temperature on the second day at about 40 degrees, but the engineer's log shows 48 degrees, and the company's record shows 60 degrees. On the next day the Government record shows from 40 degrees to 38 degrees; the engineer's log gives 46 degrees, and the company's record 50 degrees. And so on, every day there is a discrepancy, there being a difference of ten or fifteen degrees on some days, but gradually getting nearer until the ship reached the other side. That shows that these thermographs were placed in different parts of the compartment, and that an enormous difference in temperature existed in different parts of the compartment. Now, we have records of 30 degrees, and as there is such a wide difference in the three records, it is quite possible that there were places in the chamber where the temperature went a good deal lower than 30 degrees. If the thermograph showed 30 degrees in the centre of the chamber, what would be the temperature along the coils ? Perhaps the fruit there was frozen ?

I took the trouble to look through the records of last season's shipments in cold storage, including butter, cheese, and fruit. I found that some of the records were pretty perfect, in which case the goods arrived in good condition, and were sold at a good profit, but in one case out of three the record varied too much, and the chamber was either too hot or too cold. I am forced to conclude that fruit near the coils may be frozen. while in other parts of the same chamber it may be ruined by being too hot If Mr. Woolverton had not had the same experience as I had, I should have concluded that the fruit went on board in bad condition, but with the evidence I have before me, I am satisfied that fruit was injured on the steamship that ought to have gone over sound.

I am aware that the Government has now no control over these boats. Since the heavy subsidies expired, the Government has, unfortunately, had no control whatever. If we cannot carry Bartlett pears over, what folly it is to talk of shipping peaches and plums. But in my own simple ice storage house, I can carry them for six weeks in perfect condition. What is the reason, then, that we cannot send them for a ten-days' trip across the Atlantic on boats that are fitted up at great cost with the most approved machinery and appliances ?

I observe that Mr. Moore mentioned the fact that a consignment of California fruit in the same shipment arrived in satisfactory condition. But we must not forget that the California fruit is not as perishable as ours. They can carry their peaches, pears and plums clean across the continent in their cars, and they arrive perfectly sound. I have seen their plums stand in the cold storage for six weeks without rotting. Their fruit is grown in a climate where they have no rain, and is of such a texture and character that it will carry far better than ours, so that there is no comparison.

Mr. Moore : Mr. Smith has referred to the record of the company's thermograph. The company has no thermograph. There is only one thermograph in the chamber, and that is the Department's. If he received any thermograph record from the company that does not agree with the record I have, he received a record from a thermograph from one of the other chambers.

Mr. Peart : So far as the shipment of pears is concerned, we in the Burlington district have very little confidence in the steamship accommodation. I sent a shipment of Duchess apples over, and the record showed a temperature of 38 degrees. Consequently, they arrived in Glasgow in splendid condition, and were so hard that the consignee actually held them over for a week, and we received very high prices for them. When we ship apples to the Old Country we feel confident that in ninety-nine cases out of a hundred they will arrive in good condition ; but with pears it is very doubtful, indeed, and our idea is that the storage on board ship is unreliable.

Mr. MacKinnon : I think we are losing sight of one end of the question. We are not here to represent the steamship companies, but are just as anxious as you are to secure better transportation. What about the refrigerator cars, are they perfect ? Is the proper temperature maintained in the car ? The temperature maintained in the car containing Mr. Woolverton's first shipment was from 53 degrees to 56 degrees. Should we not do something to secure a satisfactory temperature in these cars, say of 40 degrees to 44 degrees ?

Mr. Bunting: My experience with cold storage is that it is possible to keep pears in good condition for several weeks, provided they come into cold storage in proper condition. But if the fruit is partly ripened before being placed in cold storage, it is impossible to check it afterwards. I think that in the various sections there should be proper local cold storage equipment for this purpose, so that immediately after fruit is taken from the trees it can be put in cold storage in process of packing. It is difficult to assemble entire carloads of pears for shipment, and during the interval the ripening process is going on. Probably this would account for the fact that the pears examined by Mr. Smith's agent in Montreal were green, while those examined by the Government inspector were commencing to mellow. My experience leads me to believe that it is more important to have the beginning of the system perfect than the end.

Mr. Hammond: After fruit has been in cold storage for a certain length of time, it becomes very cold. If it is then exposed to the warmer air outside, it will condense moisture from the atmosphere on its surface. It is afterwards returned to cold storage, it goes on soaking wet, and is in a very bad condition to keep. I have been at this work for quite a few years, and know that this is the case. The storage is not often of such a character as to dry the fruit. On some of the steamships there are fans for creating a current of air that will dry up the moisture, but in others I have been on, there are not. If the conditions were such that the fruit could be put into cold storage and kept cold till it reached its destination, without involving exposure to the warm air, it would be in a much better condition.

Mr. Smith: In reference to the thermograph records, I wish to say that I have just made a comparison of the records which I supposed was the company's record with records from other chambers, and there appears to be no doubt that a mistake has been made, and that the record sent me was the record of another chamber on the boat.

Mr. Pettit: Is not the fruit sometimes exposed at Montreal from the time it arrives in the refrigerator car until the time it goes on board ship, for several hours, perhaps a whole day?

Mr. MacKinnon: I am aware that sometimes these delays have occurred. We have asked our inspectors to notify us in such cases, and to use their best efforts to secure prompt transfer to the steamer.

Mr. McNeill: I have noticed that the editor of the Horticulturist, in writing for that journal, whenever he has a chance is inclined to put the whole blame on the steamship companies for the failure of some of the cold storage shipments to Great Britain. I come before this meeting in full sympathy with the fruit growers in this matter, and maintain that we must have an impartial analysis of the conditions that underlie this matter. I have given it very careful consideration; I have examined all the conditions. I have watched the operation from the picking of the fruit until the time when it was placed upon the steamer, and, having done so, I give it as my unprejudiced opinion that the strongest link in the chain of transportation is the steamship company: it is the very best of all the links from the orchard to the market. Still it is not perfect. The Lakonia shipment was not perfect; the steamship company was to blame a little; but, taking the Sicilian shipment, I cannot see how any man who has had Mr. Woolverton's experience could expect that shipment to go to the Old Country in good condition after it had been rattled over the Montreal pavements for two miles from the cool storage on the train to the cold storage warehouse through the heat of a September day.

Q.: Why should not the car have been run into the cold storage building?

Mr McNeill: That is exactly it; that is what we want to get at.

Q.: Who has the power to correct that?

Mr. McNeill: Mr. Woolverton himself. Why does he not take that matter up? The Department has no control over it.

Mr. Smith, "Weekly Sun": But the individual worker cannot look after these things: if the Government has not the power, it ought to take the power.

Mr. McNeill: That is what I want our committee to take up. I do not ask Mr. Woolverton to do that personally; it is the work of our committee.

Mr. Smith: This matter should not rest upon the Association; it should rest upon the Government.

Mr. McNeill: I want to point out at what stage the difficulty with this particular shipment arose. The fruit was taken from the cold storage on the train out into the moist, warm air, becoming heated up. It then goes back into cold storage and is cooled off. It goes through the same process again six days later on its way to the steamship; there is another warming up and another cooling down. In consequence of this, I claim that the fruit was spoiled before it was placed on the steamship at all, and if that is the case, what is the use of blaming the steamship company? Experiments at Washington have proved that the most important point in the whole system is to have cold storage right at the beginning, immediately the fruit is picked, so that it is not allowed to begin to ripen, as if the ripening process is once started it will go on more or less in spite of the fact that the fruit is afterwards placed in cold storage. My charge is that it is we fruit growers who are to blame rather than the steamship companies. The steamship companies are not doing their whole duty, and the railroads far from their duty, but neither are we doing ours.

Q.: In what way?

Mr. McNeill: By not cooling our fruit down immediately it is picked and keeping it cool. The fruit growers must cool their fruit, and we must have a better refrigerator car service. I suspect that this is worse than the steamship service.

FRUIT PACKAGES.

By A. McNeill, Fruit Division, Ottawa.

In introducing the subject, Mr. McNeill called attention to two charts, showing the Canadian and foreign box dimensions, as follows:

CANADIAN.	Dimensions.	Capacity.
British Columbia	9¾ x 11 x 20⅝	2225
" "	10½ x 11½ x 18¼	2200
" "	10 x 12 x 18½	2222
" "	10 x 11 x 20	2200
" "	10¼ x 11½ x 18½	2177
Inglehart & Garner	9 x 14 x 20	2520
J. D. Sherwood, N. S.	10 x 11 x 20	2200
J. W. Brennan, Grimsby	10½ x 11½ x 22	2656
Burlington Shippers	9 x 12 x 18	1945
R. J. Graham	11 x 11 x 22	2662
Brockville Box	10½ x 11 ½ x 22	2656
" "	9 x 12 x 24	2592
J. Guest, Lucan	10¼ x 10½ x 20¾	2252
Imperial Bushel		2218.2
" Quart		69.3
Wilson Bushel	10½ x 10¾ x 20½	2219
FOREIGN.		
California	9¾ x 10⅞ x 19½	2064
Idaho Standard	10½ x 11½ x 18	2174
" Special	10 x 11 x 20	2200
Colorado	11½ x 11½ x 20	2413
Arkansas	9 x 12 x 20	2160
Oregon	10 x 11 x 22	2420
Oregon, W. A. M.	9¾ x 11 x 20¼	2172
Washington, 1st	10 x 11 x 20½	2241
" 2nd	10½ x 11 x 18 9-16	2143
Missouri	10½ x 11½ x 18	2174
Montana	10½ x 11½ x 18	2174
California, W. & Co	9¾ x 10¾ x 11½	2148
" J. M. S.	10 x 11½ x 21½	2418
Tasmania	10 x 11 x 20	2200

I propose to-day to speak of the size of a standard Canadian apple box, having special reference to a recommendation that may be found suitable for the fruit growers of Nova Scotia as well as those of British Columbia. There is sufficient fruit shipped in boxes to create an interest, and yet not so much that there will be any serious disturbance to the trade by adopting a standard package. Recognizing that this is a national question, and not a Provincial one, I will submit to you a very large correspondence with representative men in all parts of the Dominion. I make no apology for offering you first a letter from Mr. W. A. MacKinnon, Chief of the Dominion Fruit Division. Mr. MacKinnon spent one year in England, and previously had much experience, in connection with the Paris Exposition, in fruit, and has since made this matter a subject of special study. I have no hesitation, therefore, in saying that he is as well qualified probably as any man in the Dominion to pronounce upon the subject :

A. McNeill, Esq :

In answer to your enquiry regarding a standard apple box, I will say that there is undoubtedly a large and increasing demand in Great Britain for the finest class of Canadian fruit put up in a box to hold from 40 to 50 pounds of fruit. The majority of dealers on their own account suggested 40 pounds net, but I believe it is a matter of comparatively little moment whether the package holds 40 or 50 pounds, so long as the net weight lies between these figures. It is, however, of the highest importance that Canadian shippers should all use the same size. The British trade complain bitterly that they never know until they have opened the package and weighed the contents how much fruit they are to get in the Canadian box. Even the dimensions do not assure them of this, owing to the free use which some packers make of excelsior.

Since the great desideratum is uniformity, and since it is difficult to change a custom once established, I think the Association should take measures to co-operate with the Fruit Growers' Associations in the other Provinces in order to agree upon a standard box for the whole of Canada. Whether there should be legislation to compel adherence to this size is a question which need not be discussed here.

The British Columbia Association has already recommended the use of what they call the "California" package, measuring 10" x 11" x 20", inside. This package is also in use in Oregon and in some parts of Nova Scotia, and some of the Tasmanian boxes are of the same dimensions. Having already obtained the sanction of somewhat widespread usage, it appears to me that this size should have the serious consideration of your Association as being one which has a better chance of being universally adopted than any of the odd sizes which are found at different points in the country.

Yours truly,

W. A. McKinnon,

Chief Fruit Division.

Though this letter covers nearly all points of the subject under discussion, it will still be interesting to note what others have to say. Mr. E. Cumminger, Melvern Square, N.S., writes to the Fruit Division as follows :

"I am thinking of sending my Ribstons and Kings in such boxes this year, but, not knowing the exact measurement of a bushel box, would you kindly send me the proper dimensions for the inside of the boxes, and instructions how to pack them, and whether they should be wrapped in paper or not ?"

This is only one of many letters which show the increasing interest in this subject, and the necessity of coming to some conclusion in the matter of an apple box. That the Canadian trade is seriously hampered at home is well shown by the following extract from a letter from Mr. G. W. Hunt, of the Ottawa Fruit Exchange :

"Growers have resorted to all manners of packages this year. We have received boxes ranging in size from 10 x 12 x 18 to dry goods cases, containing about two barrels and a half. I would recommend a medium size, holding as nearly as possible one bushel. This package would be very convenient for more reasons than one. The principal one that I would mention here is the fact that a great number of our Fameuse or Snow apples go to the United States, and if we use a bushel box we pay duty for that and no more, but if the box holds less than a bushel we pay for a bushel anyway, and the duty is 25 cents a box."

But it is not only the home market that is injured by the want of uniformity in packages, the foreign market is very seriously affected. I quote from a report made by G. H. Vroom, Dominion Fruit Inspector, who spent some time in Covent Gardens and other London markets last summer :

"Length 20½ inches, width 11 inches, depth 9½ inches. Thickness of ends ⅝ inch, sides ¼ inch, of soft wood, and quite light."

"Tasmania box—length 18½ inches, width 14 inches, depth 8¼ inches. Thickness of ends ¾ inch, sides ¼ inch, hardwood, resembling oak, and quite heavy."

"California box—length 18½ inches, width 11¾ inches, depth 8½ inches. Thickness of ends ¾ inch, sides ¼ inch, soft wood and light."

"I heard a great many complaints about the Canadian box on account of the variation in the size. A box containing forty pounds is about the right size for the English market."

"Not many boxes are wanted for the export apple trade. In fact, only a few choice apples should be shipped in boxes. The barrel is the proper package for the great bulk of Canadian apples."

Mr. Russell, a very large dealer in Glasgow, writes as follows :

"In regard to packing of apples in boxes I consider this package should only be used for No. 1 fruit, as the demand for apples packed in this way is only for better class trade, and, in fact, anything apart from really fancy stock sells as well if not better, in barrels than in boxes. This package should weigh on an average from 50 to 54 pounds gross, and the use of excelsior among the apples (unless for soft varieties) should be discontinued."

I have prepared a chart giving the dimensions of a few of the boxes in use in Canada as well as among our competitors. This will show the great diversity of sizes. The only apparent uniformity is in the capacity, and here we can get a number of the boxes that are nearly of the same size.

Mr. Maxwell Smith, Dominion Fruit Inspector for British Columbia, writes as follows :

"I beg to say that there are three distinct styles manufactured and used in this Province, namely, 20 x 11 x 10 ; 18¼ x 11½ x 10½ ; and 18½ x 12 x 10, all of which contain nearly the same cubic inches, but the first-named is the box which has been repeatedly recommended and endorsed by the British Columbia Fruit Growers' Association as being the most desirable shape and style, and the box in which the greatest variety of apples could be packed. There are other styles of boxes also used for shipping fruit in British Columbia, viz., salmon boxes, chicken coops, etc., all sizes, but we are discouraging that sort of thing as much as possible, and they are rapidly disappearing."

"The 20 x 11 x 10 box is what is commonly known as the California package."

British Columbia is using nothing but boxes for all grades of fruit, and it is extremely improbable that the barrel will ever come into general use there. Their opinion, therefore, deserves special consideration. Though they are still quite young in the fruit business, they have used more boxes perhaps than the older Provinces. Nevertheless, as this letter shows, there is no uniformity there. Owing to the fact that fruit comes into British Columbia in large quantities from the States to the south of the border, the British Columbia people are obliged to pay some attention to the boxes their customers thus become familiar with, which probably accounts for some of the variations in size.

Mr. Geo. Lamberson, Secretary of the Board of Horticulture, Portland, Oregon, writes :

"Replying to your favor in the matter of sixes of the California apple and pear boxes, will say the apple box is 9¾ inches deep ; 11 inches wide ; 20⅝ inches long, inside measurement. The pear box is 8½ inches deep; 11¼ inches wide; 18⅛ inches long, inside measurement."

Mr. W. J. Brandrith, Secretary-Treasurer of the British Columbia Fruit Growers' Association, says:

"This Association recommends a box having a capacity of 20 x 10 x 11, inside measurements, and we are of the opinion that having always used boxes we are in a better position to advise as to the requirements than our eastern friends can be. However, what we want is a lawful standard box, as at present anything is a box of apples, from 35 to 50 pounds."

The Nova Scotia people, though growing more fruit than in British Columbia, have only lately become interested in the box question. Mr. S. C. Parker, Secretary of the Nova Scotia Fruit Growers' Association, writes:

"Re standard apple box. There has been no particular demand for box shipments from this Province. The question has been discussed in the Association from time to time, but without action.'

The question may very well be asked, is any one of the sizes used to so great an extent that the changing of it would impose any great hardship upon the shippers who had adopted it. This, I think, must be answered in the negative. It is very true that several individuals are perfectly certain that they have the only box that should be adopted, and will consider themselves aggrieved if any other is selected.

Messrs. Inglehart and Garner have been using a size 9 x 14 x 20 for one or two years, and have made somewhat large shipments. A few miles from this firm are the Burlington shippers who use a size 9 x 12 x 18; and just around Burlington Bay is Mr. Brennan, of Grimsby, using a size 10½ x 11½ x 22. Now, no doubt, each of these thinks that his box possesses some special merit, but when you come to look at the measurements of capacity you will find that the Burlington shippers are giving 1,945 cu. inches of space, that Mr. Brennan is giving 2,656 cu. inches, which is nearly a fourth more. We find that Mr. R. J. Graham, of Belleville, is shipping very largely a box 11 x 11 x 22, that has about the same capacity as Mr. Brennan's box. His neighbors in Brockville are shipping a box 10½ x 11½ x 22, agreeing in capacity with Brennan's box. Mr. Brennan writes as follows: "I am at present packing apples in cases and trying different sizes, and find that 22 x 11½ x 10½ is the only size in which I can pack four sizes of apples correctly graded, and have each box snugly packed without using excelsior. I have used 22 x 11½ x 10½ for four years, and trust that any other size will not become legal, for after thorough study it is the only box. But against this you must place the following from Messrs. Stirling & Pitcairn: "We shall be reluctant to have once more to change the size (10¼ x 11½ x 18½) of our boxes, as they have been changed so often during the past few years. One reason anyhow for our adopting the box we now use was that when we ship to the market in the Kootenay we come into competition with apples shipped in from Washington and Oregon, and it is necessary to have a package similar to what is used on the other side," and so it goes. It is evident that we must run contrary to the feelings of a number of individuals if we propose a standard box. All things considered, the size that appears to meet with most general approval is a medium between the smaller and the larger. The smallest size which, as you see here, 9 x 12 x 13, has been condemned in the British market as containing too small a quantity of fruit. The largest size is not only awkward to handle, but contains more apples than the buyer will give the box credit for, and consequently the box that appears to meet the general needs of the case is the one sometimes called the "Tasmanian," 10 x 11 x 20.

Mr. Wm. Wilson, the proprietor and inventor of the Wilson case, has given a very great deal of attention to this matter of boxes, and his conclusions are worthy of respect.

"One-quarter-barrel-case, 18 x 12 x 9, holds just 28 quarts, or about 40 lbs. of apples, and is equal to one-quarter barrel of 112 quarts, the former size of barrels, and, while

18 x 12 x 9 is a very economical size case for packing apples, it has no exact proportionate relation, either to the standard bushel or barrel of to-day."

"One standard bushel case can be made for 12 cents, whereas the quarter-barrel costs 10 cents."

"The cost of dock dues in Britain is charged per package, within certain limits, so that bushel cases would cost same as ¼ barrels."

"One bushel, being a standard measurement everywhere, as well as an exact proportion of a barrel, is, therefore, the only proper standard for a national package, whereas calculations made by the ¼ barrel would only produce confusion and friction between buyer and seller."

"Half-bushel cases are also very convenient, and in exact proportion for the finer fruits."

"Bushel-cases have an advantage over barrels in ocean freight, for while 5 barrels are charged as one cubic ton, it takes about 24 bushel-cases to make 40 cubic feet."

Mr. Brandrith's views are corroborated by Mr. Palmer, Freight Rate Commissioner for British Columbia, who writes:

"So far as British Columbia alone is concerned, the 10 x 11 x 20 size would be satisfactory. I feel safe in stating that if this box is selected as the Canadian apple box, packers will soon adjust themselves to the situation and modify their mode of packing to suit. The present unsatisfactory state of affairs is due to the fact that there is no standard size. I favor this size, as it dispenses with fractional measurements. I recommend this for the standard Canadian apple box, and am convinced that it will give general satisfaction if adopted. The other size mentioned, 9 x 12 x 18, is an impossible package for the Pacific coast trade."

"I regret to state that no one size of box is universally used in British Columbia. The two sizes mentioned—10¼ x 11½ x 18½ and 10 x 11 x 20—are mostly used, and you will note, have practically the same cubic capacity. The shorter and deeper box permits of the better packing with large-sized fruit, but it is not, in my judgment, so good a box for general use as the other one, which is also the box used by Oregon and California apple packers for London shipments. All sixes of apples can be packed in the latter, but for fancy trade only four of five tier fruit is used."

Mr. Hunt, of the Ottawa Fruit Exchange, also touches upon this subject, and I would draw particular attention to his reference to the sale of apples in the United States. This is a large and growing trade, and if the day should ever come when Canada and the States would have a common sense reciprocity treaty the United States would be our largest and best market for fancy apples. As the people of the States are showing evident symptoms of a strong desire to reciprocate in trade matters, it would become us to note the signs of the times, and be prepared for it. It will be a happy day, indeed for the Canadian grower when he can secure access to the southern markets.

Summing the matter up, I would conclude that this Association could not do better than to join with the other Provincial fruit growers' associations in recommending the size, 10 x 11 x 20. British Columbia, as will be seen from the letters of Mr. Palmer and Mr. Brandrith, has already adopted this size, and we have Mr. Parker's assurance that Nova Scotia will adopt it. Mr. MacKinnon has strongly recommended this size. I therefore move for the purpose of getting it before the Association that this size and capacity be adopted.

Mr. Woolverton: I am glad to second the motion adopting that size. I have used about 6,000 boxes this year in shipping to the old country, and have been using 9 x 12 x 18, aiming to ship a forty-pound box, as I have understood from a good many of the consignees that such a box would suit their trade, but in taking this box and weighing it, I found it came a little short of the requirement, and is, therefore, not quite satisfactory. In many ways a box holding about a bushel would be more satisfactory. The size given would be the most satisfactory size to pack, fitting the size of the apples very well.

Mr. Smith: I do not think that this question ought to be decided off-hand; it is too important, and ought to be discussed by a fairly large committee. I agree with the arguments in favor of a standard box; it is ridiculous that we should have so many different sized boxes. The same arguments that applied to uniform baskets will apply to uniform boxes. My idea is to have a box with a capacity of a third of a barrel. The larger the box, so long as it is convenient to carry and handle, the more economical it is. I should deprecate strongly any box smaller than this. Then the question is, which barrel is to be taken as the standard? The box proposed would contain a third of the Nova Scotia barrel, but would have to be somewhat larger to contain a third of the Ontario barrel, and we must decide upon which to adopt. The arguments in favor of the large barrel are strong. We have the reputation in the British market of having a big barrel, bigger than the American barrel. We sell to experienced dealers who know the difference between the sizes and are willing to pay for the difference.

Mr Thompson: I think that the barrel question will settle itself. A great many of our packers are using a 28-inch stave barrel, and I think it is only a question of time when all will be using the Nova Scotia barrel.

Mr. McKinnon: That is our experience in observing the shipments going forward this year. There is no doubt that the Nova Scotia barrel will sell for just as much in London as will the Ontario barrel, and it looks as though Ontario shippers were beginning to think this.

A committee, consisting of Messrs. Wilson, E. D. Smith, L. Woolverton, A. W. Peart, Robert Thompson, was appointed to consider the matter and report their decision to the meeting.

The Committee on Fruit Boxes presented the following report:

Your Committee would recommend that the Canadian Commercial Apple Box be one of which the cubic contents are about one-third of the Canadian commercial apple barrel, and measuring inside ten inches deep, eleven inches wide and twenty inches long; and that the Canadian pear box be one-half the capacity and half the depth of the apple box; and that the Secretary communicate with the Secretaries of the Fruit Growers' Associations of other Provinces in reference to uniformity in this matter.

On motion of E. D. Smith, M.P., seconded by Wm. Rickard, M.P.P., the report was adopted.

PEACH GROWING IN MICHIGAN.

By Professor L. R. Taft, Agricultural College, Michigan.

The expression "Michigan fruit belt," or "Michigan peach belt," is often heard, but many persons have an incorrect idea if they think that the only place in the State in which peaches can be grown successfully is in the tract to which the above terms are commonly applied, which is a strip from five to twenty miles in width extending along the east shore of Lake Michigan nearly to Mackinaw. Scattered all through the southern portion of Michigan there are thousands of orchards, many of them of considerable size, which are nearly if not quite as productive as in the famed "peach belt." The difference is that, away from the influence of the lake, the peach can only be successfully grown upon ridges where good air drainage can be secured, while in the counties along Lake Michigan little attention need be paid to the elevation, provided the soil is not wet, and, hence, in the peach belt a large proportion of the land is given up to peaches.

Location and Exposure.

The prevailing cold winds are from the west, and, as they pass over the broad and deep waters of Lake Michigan, which never freeze, they are tempered, so that if forty degrees below zero in Wisconsin, it is seldom more than ten degrees below zero in Michigan within five miles of the lake. Even in that section it has been thought that only the more elevated portions should be used for peach orchards, but less attention is now given to the matter of elevation, as thousands of acres of comparatively low land and level land have during the last ten years been set to peaches, and the trees have been fully as productive as upon the higher land. In the interior counties of the State the mercury occasionally drops to twenty degrees below zero, and in selecting a site for a peach orchard the first thing to be considered is its elevation above the surrounding country.

Good results are obtained in all exposures, but especially towards the northern limit for peach culture a northern slope is preferred. While there are objections to both eastern and western slopes, they are less serious than those against a southern exposure.

The Soil for a Peach Orchard.

The ideal soil for a peach orchard is either a heavy sandy loam or a light clay loam. There are many orchards, however, on land that is quite light and sandy, but while the trees may have a fair growth, they do not bear as well, and the fruit is smaller and inferior in flavor to that grown upon heavier soils. A soil that is rich in humus is desirable fully as much for supplying moisture in dry seasons as for furnishing plant food. When trees are planted upon land where a clover sod was turned under the previous year, they are quite sure to make a good start.

Selection of Trees and Distance of Planting.

A tree of medium size is usually selected by experienced orchardists, as trees more than five feet high and with a diameter of more than one inch are generally less hardy and do not start as well as those of a somewhat smaller size. Those from five-eighths to three-quarters of an inch in diameter and about four feet high are generally selected, although many have good success with whips from two to three feet high.

A few years ago the usual distance for planting was sixteen to eighteen feet each way, but most orchards are now planted twenty feet square. It has been found, however, that at this distance the trees, even though cut back severely, soon crowd above ground, while the struggle for existence between the roots is so severe that the trees suffer both in vigor and productiveness. In several instances the alternate rows of trees have been removed with marked benefit to those remaining, both in the appearance of the trees and in the quantity, size, color and quality of the fruit. By the removal of one-half of the trees the labor of cultivation has been decreased, and with but one-half the number of trees to prune and spray the quantity of the fruit has been increased, while its value has been at least double.

Forming the Head and Pruning the Trees.

When the trees are set, they are cut back to a height of about thirty inches, and if there are several strong buds on the trunk from twenty to thirty inches from the ground, all side shoots are cut off. In the case of large trees all of the buds have generally developed into branches, and in that case all except four are removed, and these are cut back to two buds. If all of the branches are cut away close to the trunks, adventitious buds would have to be depended upon for forming the head, and, as these might start out anywhere along the trunk, the top would not be as symmetrical as when four stubs are left as recommended. During the first season the trees will require little if any pruning, although if a tree is forming a poorly-shaped head a little judicious pruning will often be helpful.

The following spring, as soon as severe freezing weather is over, the trees should be pruned and the head formed. All but three or four of the strongest branches, which are evenly distributed about the trunk at the point where the head is desired, should be cut away, and these should be shortened from fourteen to eighteen inches. If cut back shorter than this, it will make the centre of the tree too thick. There is a difference of opinion regarding the proper distance from the ground to the first branches, but twenty inches is high enough.

As the trees develop, the pruning given is a combination of heading back and thinning out. The ends of the main branches and the side shoots that have made a growth of fifteen inches or more, are headed back from one-third to two-thirds of the annual growth, and especially during the first two years care is taken to remove all surplus branches that will not be required in forming the framework of the trees. After the trees are five years old, about the only heading back required will be the ends of the main shoots, but the thinning out of the trees should be continued, not only to open up the heads and admit light and air, but it can be made to perform the same function as the laborious and costly removal by hand of surplus fruit, and besides being much cheaper it permits the trees to devote their full vigor to the development of fruit.

Cultivation and Cover Crop.

For the first two years after the orchard is planted the land can be used for the growing of some cultivated crop, but small grains should never be sown in a young orchard of any kind. Melons, tomatoes and other crops that can be planted some distance apart are best for this purpose, but, if care is taken that the hills are not too near the trees, potatoes, corn and other ordinary farm crops can be grown to advantage. If the trees make a good growth during the first two years, it will be well to give up the land to them after that time. In May, before the land begins to bake, it should be plowed or harrowed. An orchard gang plow which will turn furrows two or three inches deep answers very well, or some of the disc or cutaway harrows can be used. Upon an ideal orchard soil there is no occasion for using a turning plow after the trees are two or three years old, and the work can be done fully as well and much cheaper with a harrow if taken at the proper time.

During the months of June and July it is advisable to go over the land with a harrow every week or ten days, or as soon as the soil is dry enough after a heavy rain, so as to prevent the drying out of the surface. About the first of August a cover crop should be sown. While red and crimson clover answer well as cover crops, for the purpose of supplying nitrogen, the ideal crops on other accounts are barley and oats. In ordinary seasons it is an easy matter to secure a catch, and the plants reach a height of fifteen to twenty-four inches before they are killed by frost. In the meantime they have aided the ripening of the trees, and by holding the leaves and snow prevent the alternate freezing and lessen the depth to which the frost penetrates, and thus aid in carrying trees through the winter uninjured which might otherwise be killed. This treatment gives good results after the trees come into bearing, but if the weather is dry during early August, the sowing of the cover crop might be delayed until the middle of August, especially if the trees are carrying a heavy crop of fruit. Oats or barley are better adapted for late sowing than most of the other cover crops. Another advantage in these crops is that they die in winter and act as a mulch in the spring, thus preventing the drying out and baking of the soil. While it is not advisable to delay the working of the land until after the middle of May, a good cover crop of oats will generally keep the land moist until the first of June, while if clover or rye have been sown it is often baked as hard as a brick by the first of May.

Feeding the Trees.

If the soil at the time of planting the trees contains a liberal amount of humus and plant food, the application of manure will not be necessary until the trees begin to bear, but it pays to keep the trees growing, as they can often be brought to a size that permits them to bear a full crop of fruit one or two years sooner if a liberal supply of food is furnished than if they are grown upon land that is deficient in plant nutriment. While stable manure is valuable because it supplies humus, as well as the elements needed by the trees for their growth, there is danger if applied in too large quantities, as it causes a rank growth of the trees which may be injured by the winter. Ten to twenty tons per acre can generally be used upon bearing orchards with good results, when the soil is deficient in humus and nitrogen, and the danger of injury to the trees will be lessened if it is supplemented with 50 to 100 bushels of unleached wood ashes and 300 to 500 pounds of ground bone or acid phosphate. If the ashes cannot be obtained, from 200 to 300 pounds of muriate of potash can be substituted. The manure can be applied at any time during the winter, and the fertilizers can be used then if there is no danger of washing, or early in the spring.

Fighting Insects and Diseases.

Peach trees are subject to the attack of numerous insects and diseases, some of which are readily controlled, while others are more formidable. In Michigan the diseases known as "yellows" and "little peach" have been quite destructive in some sections, and they have baffled every effort to ascertain their nature. Both are contagious, but it is known that if trees attacked by "yellows" are removed, as soon as the disease appears, its spread can be prevented. The same treatment is being tested for "little peach," but, although it appears to be helpful, it is too soon to speak definitely as to its efficacy.

Borers in the trunks can be held in check by removing the soil to the depth of two inches, and, if any gum and chips appear on the bark at the end of a week, it is taken as an indication of the presence of a borer, and he is dug out with a knife. If the plum curculio is troublesome, the trees are jarred three or four times a week during the latter part of May and early June, and the insects are caught upon sheets spread upon the ground. If very troublesome, it is a good plan to spray the trees with Paris green and lime at the rate of 1 pound of the former and 5 of the latter in 200 gallons of water as soon as the fruit has set. By the addition of Bordeaux mixture, of about one-half the usual strength, the injury from brown rot, scab and other fungous diseases can be greatly lessened, although more can be done by the removal and destruction of all diseased fruit and the working of the land before the fruit has set.

Another very destructive disease, in seasons when the weather in May is cold and wet, is commonly known as "leaf curl." This causes the new leaves to thicken and roll up, and if the attack is a severe one they drop from the trees. This often results in the dropping of the fruit also, and a severe check to the growth of the trees, although it is seldom fatal after the trees are one year old. For this disease a very cheap and effectual remedy has been found. If the trees are sprayed with a solution of sulphate of copper, at the rate of 1 pound in 50 gallons of water, either in March or early April, the disease will be prevented from injuring the trees. Thoroughness and earliness are the only essentials.

Thinning the Fruit.

There is another operation that should not be overlooked if first-class fruit is desired, and that is the removal of the surplus fruit from the trees. This is generally done during the latter half of June and early July, after the dropping of the fruit from the work of curculio, leaf-curl and other causes is over. Just how much fruit should be left upon a tree depends upon a variety of conditions. If the trees are vigorous, well-cultivated and supplied with plant food, they can carry to maturity much more fruit than if neglected and unhealthy. Then, too, the thinning should be much more thorough in years when a large crop is promised than in years when it is a partial failure, as in years of plenty, small and medium sized fruit may hardly repay the expense of picking and marketing, while large fruit can be handled at a profit. On the other hand, when there is a short crop, fruit of any size will bring a good price. By the removal of from one-fourth to three-fourths of the fruit, the size of that left upon the trees will often be so increased that there will be nearly if not quite as many bushels as if all of the fruit had been allowed to develop, and, being large, well-colored and of good quality, it may bring three or four times as much per bushel as the unthinned fruit. By the thinning of the fruit the strain upon the vitality of the trees has been lessened, and, while the trees that were not thinned may be so weakened that they will not bear the following year, the trees that were properly thinned may be able to produce a crop of fruit each season. While no definite rule can be given as to the number of fruits that should be left upon a tree, it may be said that as a rule there should be no more than two fruits upon any twig, unless they are more than four inches apart. In the case of large varieties like Elberta, the distance between the fruits can often be increased to six or eight inches with profit, and some growers, in seasons when there is likely to be a glut in the markets, increase the distance to ten inches if the trees have been headed back so that the tops are rather thick. The cost of thinning the fruit is not large, and as, if left upon the trees, it will have to be picked when ripe, many consider that it actually takes less time to pick off half of the fruit when small and drop it upon the ground than to pick all of it carefully when ripe and place it in baskets. Every person who has compared the results secured when the fruit has been thoroughly pruned and the fruit has then been thinned, with those obtained when the trees were left unthinned, will be forced to admit that the only way to grow first-class fruit, in years when the trees have set a full crop, is to thin the trees, using the pruning shears for this purpose in April, and then taking off all surplus specimens in June.

Marketing the Fruit.

A large amount of the Michigan fruit is required to surplus the local demand, but thousands of carloads are shipped to other States each year. Some of this fruit is consigned to commission men in Chicago, Milwaukee and other cities, but a very profitable trade has been built up by some of our best growers who ship on orders from day to day to the grocers in the surrounding States. In this way the profit that otherwise goes to the middleman is saved, and the grocers secure their fruit in a fresh condition. We also have a considerable number of co-operative shipping associations, which not only ship the products of the orchards of their members, but in some cases handle the fruit of other growers. This fruit is delivered to the central packing houses, where it is graded and packed. The plan of selling the crop upon the trees is growing in favor in some sections. Sometimes a lump sum is taken for the fruit, and the purchaser picks and packs the crop, taking all the risk, or the crop may be sold at so much per bushel for the different grades. In this case it is generally picked by the grower, and he may, or may not, grade and pack it, according to the contract.

There are a considerable number of peach growers whose orchards are extensive enough to enable them to accept orders for carload lots, and these men often sell their fruit to wholesale dealers in cities as far away as Boston, Mass. In several counties which have important orchard interests markets for the sale of the crops have been established, and the fruit, after being graded and packed by the grower, is hauled to these markets upon large waggons carrying 80 to 100 bushels and sold. The most important market of this kind is at Grand Rapids, and as it is not uncommon to have fifty or sixty buyers there from all parts of the country, the competition is often an active factor in securing for the grower the highest market price. The railroads and steamboat companies reaching these market points are doing what they can to favor the industry by giving reasonable freight rates and excellent service.

Varieties for Market.

While the varieties grown in Michigan may not all of them be suited to the conditions in Ontario, a short list may be of interest. Although there is a limited demand for fancy white varieties, at good prices, few growers are planting anything except yellow sorts. The leading sorts are St. John, Conklin, Early Crawford, Engle, Elberta, Kalamazoo and New Prolific, Smock and Salway. Hill's Chili and Gold Drop are favorites where extremely hardy sorts are needed. Of the white kinds Lewis and Early Michigan are most grown. They ripen about the middle of August, and are among the best of the early sorts. Triumph is about the first of the yellow kinds, but Admiral Dewey promises to take its place, as it comes nearer to being a freestone and appears to be less subject to brown-rot. Of the new sorts none are more promising than Oceana, which ripens about the middle of September, and seems to be quite hardy and productive. The fruit is of good size, handsome in appearance and of very good quality. It has been quite thoroughly tested and promises to be an excellent market sort.

Object Lessons.

I have somewhat hastily sketched the methods found most valuable by the leading peach-growers in Michigan, and, as the conditions in Southern Ontario are quite similar to those that are found in Michigan, I feel confident that they will be found reliable on this side of "the line." However, as the eyes are more useful than the ears when one wishes to obtain practical information, I trust that those of you who intend to engage in peach growing upon an extensive scale will not fail to take a trip through the Michigan "peach belt," and although we shall be glad to welcome you as visitors and will take pleasure in showing you the orchards, it will suit us even better, if, as a result of your visit, you may conclude to settle among us and thus permit us to practically "annex" you.

Q.: Is the Gold Drop grown with you?

Prof. Taft: It has been largely grown in the past, but, although productive, and where well grown a good variety, too many of our growers do not properly thin the trees, and the result is the fruit is undersized. Where one requires a hardy variety and gives proper attention to thinning the trees, it is a good sort.

The Fitzgerald came into favor five or six years ago and was largely planted, but I do not know of a single satisfactory orchard. It is less productive than Elberta and the Conklin, which take its place.

The Garfield is not being used to any extent, and very few trees are being grown in the nurseries.

Q.: We are growing the Fitzgerald largely, where we cannot grow the Crawford, and it is more attractive in the market.

Prof. Taft: It has not been hardy with us, in fact the fruit buds of this variety are generally injured more than those of any other of the varieties that are commonly grown.

Q.: Are you troubled with the rot?

Prof. Taft: Early kinds frequently rot badly. If you wish a medium early white peach, I would recommend the Early Michigan; it ripens just about the middle of August, just before St. John, and except for the rotting, which in some seasons is serious, it is a very valuable peach. It is a freestone, and a very handsome white peach with a red cheek.

For the last five years from one-third to one-half of the trees put out have been the Elberta, on account of its shipping qualities

Q.: Do you plant on the north side of a hill or of a grove of trees?

Prof. Taft: The farther north you go the more reason we find for planting on the north side of a hill or grove, as it keeps the buds back, and there is less danger from frost. From the remarks I have heard, I judge you are looking for good shipping peaches. We feel greatly the need of a good shipping peach that covers a different season from the Elberta. The Engle Mammoth is one of the best, but it is not equal to the Elberta. The Oceana is a Michigan seedling, which ripens just after the Elberta, is about the same size and shape, and is far superior in texture, appearance and flavor. It is yellow, and it is with us almost equal to the Elberta in shipping. The Oceana has been tested freely in Michigan. I have had it in fruit for six or seven years and esteem it very highly. It is handled by N. P. Husted of Lowell, Mich.

Q.: Have you had any experience with the Banner?

Prof. Taft: I have not fruited it to any extent, and I do not like to speak definitely regarding it. It has productiveness, quality and appearance, but the size thus far is against it. If as the trees get older the size of the fruit increases, it will be a very valuable peach. It is a little smaller than the Kalamazoo.

Q.: What soil do you prefer for it?

Prof. Taft: We have it on a sandy loam, and it might do better on other soils.

G. W. Cady: You will not get satisfaction from it till it is about seven years old.

HARDY FRUITS FROM NORTHERN DISTRICTS.

By W. T. Macoun, Central Experimental Farm, Ottawa.

If one had been asked in the early years of the Ontario Fruit Growers' Association to prepare an address on Hardy Fruits for Northern Districts he would probably have considered that about twenty-five miles north of Lake Ontario and the St. Lawrence River would be the extreme limit thought of when the title was suggested. But now it is expected, I believe, that the whole Province should be taken into consideration, reaching as it does, to James Bay in latitude 52 degrees in the north, and to the Province of Manitoba in latitude 50 degrees in the west. When it is remembered that at Leamington we are very little north of latitude 42 degrees, and that commercial orchards of any size are not to be found at the present time much above latitude 45 degres, it will be seen that there is an immense area between latitude 45 degrees and latitude 52 degrees of nearly 500 miles from south to north, and about 1,000 miles from east to west, which may be included at the present time, as far as the fruit industry is concerned in the northern districts of Ontario. Over this large extent of country there are great differences in climatic conditions, brought about by the wide range of latitude, the large bodies of water which are very numerous in it, the differences in elevation, and the variations in the soil.

At the Central Experimental Farm, which is situated near Ottawa in latitude 45 degrees experiments in fruit growing have been carried on for the past sixteen years, one of the main objects of which is to determine what could be done in fruit growing in that latitude, and to endeavor to find the best methods of growing fruits where the climate was so severe. There is not time here to review the great number of experiments which have been conducted with varieties, methods of cultivation, spraying, cover crops, cross-breeding and hybridizing, and other matters relating to fruit growing. Suffice it to say that in the sixteen annual reports which have been published there will be found a vast amount of information which has proved extremely useful to the fruit grower in all parts of Canada.

As all the important fruits should be discussed in an address of this kind, I take up each one separately.

Apples.

The apple has a wider range over Ontario than most large fruits, although the plum is still found over a wider area than the apple. Apples have been matured in the Province of Ontario as far north as Fort Frances, in the Rainy River District, and perhaps further, and as they have been produced at Winnipeg, in Manitoba, it is probable that they will be grown in favorable localities right up to the Manitoba boundary. There is also no apparent reason why they should not be produced in favorable localities as far north as James' Bay.

At the Central Experimental Farm, where the temperature occasionally falls to 30 degrees Fahrenheit below zero, we have now between 500 and 600 varieties of apples under test, exclusive of about 2,000 seedlings and cross-bred apples, of which 199 named varieties fruited this year. Out of this large number there are few varieties which kill back at the tips. Why is it, then, that settlers in Muskoka, Parry Sound, and parts of Nipissing, where the conditions are not very different from those at Ottawa, have such difficulty often in getting trees to grow, and sometimes fail altogether? There are two great dangers which fruit growers in the north have to guard against, namely, sunscald and root killing, and two others almost as bad, blight and mice. We have experienced them all at Ottawa, and hence can speak from personal knowledge. I recently wrote to a number of men in Northern Ontario, asking what was the chief cause of failure in growing apples, and in nearly every instance it was the trunk which had gone wrong, and although the fruit grower did not know, in many cases, that it was sunscald, the description of the trouble proved it to be such. Sunscald, as it occurs in the north, is now considered to be due to the thawing and freezing which takes place in the latter part of winter and early spring. The sun shining on the south and south-western sides of the trees thaws out the sap, and a severe frost following at night either causes a separation of the bark from the wood or destroys the cambium. The injury is often so severe that the tree dies the same season, or if it does not, disease sets in, the tree becomes sickly and eventually dies. The trouble can be prevented almost entirely if proper precautions are taken. Some varieties are much more subject to sunscald than others. Where sunscald is bad, special thought should be given to the selection of the site of the orchard and to varieties. Trees should be planted with short trunks, not more than three feet, and less if possible; the less trunk exposed the less injury there will be. When planted trees should be leaned slightly towards the southwest, so that the sun's rays will not fall directly on the trunk the first year or two after the tree is planted. In the autumn the trunk should be protected with a wooden veneer, or even white paper, and an air space should be left between the protector and the tree. This will prevent the thawing and freezing to a very large extent. If these precautions are taken and the proper varieties selected at the outset, there should be little injury from sunscald. Trees usually suffer most from sunscald the first and second year after planting, and it appears to the writer that one reason they do so is that the bark of trees imported from southern nurseries is not at first suited to more northern conditions, and must become hardened or acclimatized. Another reason may be that the tree has not become thoroughly established, and the sap is not yet in the right condition. If a tree has been injured by sunscald it should be headed back and the wound scraped clean, back to living wood, and the injured part painted with lead paint. I have referred to this matter at some length, as I consider protection against sunscald one of the greatest factors in successful apple culture in Northern Ontario.

Root Killing. The winter killing of the roots of apple trees has discouraged many who have tried to grow this fruit commercially in the north, and in the early years before root-killing was as well understood as it is now, trees were killed in this way at the Experimental Farm. It is only occasionally, however, that there is a winter when root killing is likely to occur, but unless provision is made to prevent it every year, there may be unexpected and disastrous results. It is very discouraging to have trees just coming into full bearing almost destroyed by root killing. Trees are most subject to root killing during a winter with changeable weather, when there are mid-winter thaws with the ground bare and when it freezes to a great depth. Sometimes the soil is thawed to several inches in depth, a sudden change occurs during the day and the temperature may drop to zero or below the following night. This is very trying on the roots of trees, and often apple trees are killed outright, but, as they leaf out and blossom in the spring, the grower is sometimes puzzled to know what has caused the death of his trees. There are several ways in which root killing can be lessened, and if all these are practiced, root killing should be very rare indeed. First of all, trees should be grafted on hardy stocks, and the stocks ordinarlly used by nurserymen are not suitable in the north, as their hardiness is very uncertain. At the Central Experimental Farm most of the trees planted in recent years have been grafted on seedlings of Martha, Transcendent, and Dartmouth crabs, and the results so far have been very satisfactory. If a still hardier stock is desired, the wild Siberian crab—Pyrus baccata—will furnish it, and this crab has proven perfectly hardy everywhere in Manitoba and the Northwest Territories, where it has been tested, and trees grafted on it at Ottawa are doing well. I trust that our Ontario nurserymen will take pity on the people of Northern Ontario and furnish them with trees on hardy stocks. In districts where apples have been tried and have failed, I would suggest that seed be sown of apples which have been ripened as near that district as they can be had. Experience has taught that seedling apple trees will grow where grafted ones have failed, and I would strongly urge the growing of seedlings in northern districts. Another means by which root killing may be prevented is by the growing of cover crops in the orchard to protect the roots, hold the snow, and prevent the thawing and freezing of the ground. Much work has been done at the Central Experimental Farm in testing various plants for cover crops and in growing them in different ways. A third way in which root killing may be prevented is by mulching the trees with manure, earth, or any other material which will protect the roots from thawing and freezing.

Top Grafting. Some varieties of apples which will not prove satisfactory when grown as standard trees in the north are quite successful when top grafted on hardy and strong growing stocks. Among the best varieties for this purpose are the McMahon White and Haas, and among the extremely hardy varieties the Hibernal and Charlamoff. The Talman Sweet, which is recommended for some districts, is not as hardy as the above.

Mice and Rabbits. Some winters mice are very numerous and do much injury, and in the outlying districts rabbits are also destructive. The depredations of mice can be prevented entirely, and even rabbits can be kept off. The most satisfactory preventive of mice yet tested at Ottawa is the wooden veneer, which is also used to prevent sunscald. Ordinary building paper wrapped around the trunk has also been found perfectly satisfactory, and a mound of beaten snow about the trees has likewise been found effective. Tar paper is not recommended, as sometimes injury results from the use of it, and ordinary building paper is perfectly satisfactory. The mice work along the ground underneath the snow and it is not difficult to turn them. Rabbits can be prevented from injuring trees by protecting them with wire netting; by painting the trunks, and by poisoning.

Blight. The fourth great danger to apple trees in the north is the twig or fire blight No satisfactory remedy has been found for this disease yet. Varieties of Russian origin are most affected by it. At the Central Experimental Farm some trees have been killed outright, and some so badly injured that it has taken several years before they regained symmetrical proportions. By choosing varieties which are not much subject to blight, this obstacle to apple growing in the north can to a large extent be obviated.

Site and Soil. The further north one goes the more difficult it is,. as a rule, to obtain a suitable site for an orchard, and where there are so many other things to contend with, it is folly to attempt to grow apples in an unsuitable place and in unsuitable soil. The experience of northern fruit growers has been that the most satisfactory results are obtained by planting on a northern slope. It is very important to use every means in our power to prevent sunscald. Trees on a northern or eastern slope get less sun than those on a southern or western, and hence the change in the conditions of the sap is not so great. Buds are slower to develop on a northern or eastern slope and danger from spring frost is hence not so great. The richness of the soil is not nearly as important as the warmth and drainage of it. A warm, sandy loam or a gravelly soil overlying limestone with good natural drainage is an ideal soil for a northern orchard. The results from growing trees in ground with a wet subsoil will not be at all satisfactory, and clay land should be avoided where possible.

Varieties. From our own experience at the Central Experimental farm and from the experience of correspondents in various parts of Northern Ontario, the following varieties of apples are recommended for planting north of latitude 45 degrees :

District 7. North of the Quebec boundary on the Ottawa River, and west to Pembroke; and north through Muskoka, and the southern part of Nipissing, including also Manitoulin and St. Joseph Islands and Parry Sound district, within five or six miles of the Georgian Bay, the following varieties should prove satisfactory :

Summer. Yellow Transparent, Duchess of Oldenburg.

Autumn. Wealthy, Alexander.

Early Winter. McIntosh Red, Fameuse.

Winter. Milwaukee, Scott's Winter, Windsor Chief, American Golden Russet, North Western Greening, Canada Red, and Northern Spy top-grafted. The Salome apple is also doing well in Muskoka, but the fruit has been uneven in size at the Experimental Farm. The Nora and Minto, two Muskoka seedlings, are also highly spoken of. This list of winter apples will need revision almost every year until some really first-class hardy dessert apples are found, as new and better varieties are constantly being brought to the front. The Windsor Chief is the most promising new hardy winter apple, being a variety of fine appearance and good quality, and a good bearer.

District No. 13. This includes all of Ontario north and west of District 7. Only the very hardiest varieties are recommended in this list.

Summer. Yellow Transparent, Blushed Colville, Charlamoff, and Duchess of Oldenburg, the two latter being autumn varieties in this district. The first variety is not as hardy as the latter, and if only two are planted I would recommend the Charlamoff and Duchess.

Autumn. Longfield, Hibernal, Patten's Greening, Peerless, Autonovka and Wealthy apples and Whitney, Martha and Transcendent crabs. Also in the coldest parts the hybrids between the Siberian crab and apple originated at the Central Experimental Farm.

It is a surprise to those who come from the more favored fruit districts of Ontario to find how well the trees bear in the north and what fine fruit is produced. Trees which are unshapely, sometimes without a real trunk, and growing more like bushes than trees, will be simply loaded down with fruit, and these trees bear earlier than they do further south, being more or less stunted in their growth by the severity of the climate. It may be interesting to know just how much trees of a few varieties have produced in one season at the Experimental Farm at Ottawa.

Yield From One Tree in 1902.

Varieties.	Number of years planted	Yield
Duchess of Oldenburg	14	91½ gallons or about 4 barrels.
Wealthy	14	85 " " 3½ "
McMahon White	14	147 " " 6 "
Patten's Greening	10	71 " " 3 "
Longfield	14	83½ " " 3½ "
Hibernal	12	82 " " 3½ "
Charlamoff	14	102½ " " 4¼ "
McIntosh Red*	12	71½ " " 3 "

*The same trees of McIntosh Red yielded 94 gallons, or nearly 4 barrels, in 1903. Wealthy trees have yielded over a barrel of fruit six years after planting. A correspondent in the Rainy River district, 190 miles west of Port Arthur, writes that an apple tree, probably Duchess, yielded eight bushels of apples six years after planting.

For further particulars regarding apple culture in the north, see Bulletin No. 37 of the Central Experimental Farm series.

Plums.

The next important large fruit to the apple in the northern districts of Ontario is the plum. This fruit is found wild in almost every part of the Province, and is valued very highly by the people in some districts.

North of latitude 45 degrees the European is, as a rule, very unsatisfactory, unless grown near large bodies of water, which keep the air moist, as St. Joseph's and Manitoulin Islands, for instance, where they appear to succeed fairly well. It is not the number of degrees of cold which makes it difficult to grow these plums, but the dry, cold atmosphere inland has the effect of drying out the buds, and they appear to be killed in this way. Seedlings have, however, been originated in Ontario and Quebec, which are hardier in fruit bud than the standard kinds, and the time may come when some varieties will be available which will bear almost every year. Among some of these hardy seedlings may be mentioned the Raynes and Mount Royal, two Montreal plums, which seem hardier than most others. Among the hardiest of the standard European kinds are the Richland, Lombard, Gueii, Arctic, Montmorency and Quackenbos or Glass Seedling, which would be worth testing anywhere between latitudes 45 degrees and 47 degrees near large bodies of water.

At present the great dependence in the north must be on the native plums and the improved varieties of wild plum of the northwestern States, of which there are now more than 200 named varieties, which, with the varieties of the native plum, give a ripening season from the 1st of August to early in October, or more than two months; quite as long as the season of the European plum.

Although the quality of these varieties is not equal to the European, the best of them are quite good, and when eaten out of hand some people like them better. When canned or preserved, however, they are not as good, although there is a great difference in varieties. By removing the skin when preserving, the quality of the preserves is very much improved. Of the varieties which can be obtained from nurserymen, the following are the best, in order of ripening: Aitkin, Odegard, Bixby, Mankato, Cheney, Hawkeye, Stoddard. The last two would probably be too late where early autumn frosts occur. It is probable that earlier local seedlings may be found, and the best of these should be transplanted to the orchard. The Compass cherry, which is a hybrid between the wild plum and the sand cherry, is a low-growing bush, which yields good crops of fruit of fair quality.

Plum trees, like apple trees, should be planted in well drained soil, and, if possible, on a northern slope, as spring frosts often injure the blossoms. They require less care than apple trees, and when once established usually do well. The blight of the native plum is the worst enemy to this fruit in Northwestern Ontario. This destroys the fruit when it is about three-fourths grown, causing the plums to wither and drop. Thorough spraying will prevent this. In Bulletin No. 43, on Plum Culture., by the writer, special attention has been given to the American native plums, as there is such an immense tract of country where only these can be grown.

Pears.

Pears are not satisfactory north of latitude 45 degrees in Ontario. In a few places they can be grown, but the number of pear trees now living is very small. Blight and winter killing both destroy these trees. Many of the standard varieties have been tested at Ottawa, and among these the Flemish Beauty has been found to be the hardiest and least subject to blight. Fine Flemish Beauty pears are grown along the Ottawa River between Ottawa and Montreal, and they can be grown in some localities in Ontario north of latitude 45 degrees. The Longworth pear, though not of good quality, is less subject to blight than many others and is hardy at Ottawa. The Russian pears are quite unsatisfactory, as they blight badly, and are of indifferent quality and decay rapidly.

Peaches.

Peaches have been produced in the open air at Orillia, but this can hardly be considered a northern district. It is possible, however, that the northern limit of the peach will not stop at Orillia.

Cherries.

Cherries, like European plums, are not satisfactory north of latitude 45 degrees unless grown near a large body of water, as the buds dry out in winter and do not open. Spring frosts often complete the destruction of the fruit buds if the winter leaves some untouched. We have not had a full crop of cherries at Ottawa since 1898, while down the St. Lawrence River, 70 miles below the City of Quebec, where the temperature falls as low in winter as it does at Ottawa, there is a regular crop of cherries. The moist air from the river preserves the buds. The hardiest cherries in the flower bud tested at Ottawa are : Orel 25, Vladimir, and Minnesota Ostheim. Also a dwarf cherry called Koslov Morello, which is protected by the snow in winter. We are working to obtain a satisfactory dwarf cherry for the north, as we believe this to be the solution of growing cherries successfully inland.

Grapes.

More grapes should be grown in northern districts than there are at present, especially between latitude 45 degrees and 47 degrees. At Ottawa 101 varieties ripened thoroughly this year, and even in the worst years we can depend upon ten or twelve varieties at least. Among the varieties which are almost certain to ripen unless injured by spring frost are : Moore's Early, Campbell's Early, Moyer, Canada, Brant and Peabody. The Champion, which is earlier than any of those mentioned, might be included, but the quality is so inferior that I hesitate to recommend it. A new variety, the Manito, is very promising as an extra early grape of good quality.

To grow grapes successfully in the north, they should be planted in high, warm, well drained, light soil, and on a southern slope, where they will get all the heat possible. The vines should be grown on a wire trellis so that the canes may be spread in such a way as to admit sunlight and air to the fruit. As the vines have to be covered with soil in winter, it is necessary to adopt a system of pruning, which will make this labor as light as possible. A vine with two arms, and having the crown near the ground, has been found the most satisfactory method thus far. These arms are removed and replaced by new ones occasionally. The arms should be spread out within eighteen inches of the ground, and the crop of fruit should not be more than two feet from the ground. By growing the vines in this way, the fruit will get the reflected heat from the ground and will ripen better. Some parts of Northern Ontario are very rocky. Growing among and over rocks, grapes should ripen even better than when grown as already described, as the heat would be greater, and good soil is not necessary to grape growing.

Vines should be left covered as late in the spring as possible without danger of rotting, as grapes are very susceptible to the spring frosts.

Raspberries.

Raspberries grow wild so abundantly all through the northern districts that settlers are not quick to try the cultivated kinds. Among the hardiest varieties may be mentioned Marlboro, Turner, Clarke, Herbert, Sarah, Louden and Dr. Reider, the last named variety having been found among the hardiest in Manitoba and the Northwest. Where the canes are injured by winter, they should be bent over and held down with earth, so that the snow will cover them, thus protecting the canes from being winter killed. The hardiest Blackcaps are : Older and Hilborn, and of Blackberries : Agawam and Snyder.

Currants.

Currants succeed admirably in the north, and there should be no trouble in growing this fruit. The Wilder, Pomona, and Cherry, are three of the best all-around varieties, but for eating out of hand there is nothing superior to the Moore's Ruby, as it is not as acid as the others.

Gooseberries.

The gooseberry is also a hardy fruit, and, being a lower grower, is covered with snow, which makes the chances for a good crop still better. Of American varieties, Downing and Pearl are the most satisfactory, though the Whitesmith, Industry and other European kinds succeed well under some conditions.

Strawberries.

There should be no difficulty in getting the best cultivated varieties of strawberries all through the northern districts, with the exception of those parts where late spring frosts occur, when it will be more difficult to procure a crop, but by judicious management the plants can be protected from such frosts. At Ottawa the following varieties are among the most satisfactory : Bubach, Buster, Lovett, Glen Mary, Greenville, Beder Wood, Sample, and Warfield. During last spring there was a good opportunity of learning which were hardiest in the flower, as frosts occurred during the latter part of May which lessened the crop very much, and destroyed practically every blossom of some varieties. From our experience, we would recommend : Beder Wood, Warfield, Lovett, Sample, Buster, Williams, and Crescent as being among those most likely to suffer least from spring frosts. The Crescent appears to be about the most hardy.

Strawberries should always be lightly mulched with straw in the autumn, and even if there is abundant snow in winter, the plants, unless covered, may start to grow early in the spring and then suffer from frost. The mulch should be left on as late in the spring as possible without injury to the plants, as the longer they can be kept dormant the better chances of success there will be. Only a light mulch is necessary.

a heavy one may smother the plants and prove worse than none. One correspondent says that he gets best results by growing his plants in sod like wild berries. The grass in his case acts as a mulch.

Owing to the heavy snowfall in the north, there is no doubt that many things will be grown there which will surprise us. One great drawback at present is the spring frosts, but as the country opens up these will probably occur less frequently, and, furthermore, methods will be devised for protecting plants against them.

In the past, fruit culture has advanced northward with civilization, and it is likely to do so in the future. Severe climatic conditions will, however, have to be met, understood, and conquered before success is assured, and this takes time. The fruit growers of the north will be greater thinkers than those of the south, as greater difficulties will have to be overcome, special methods of culture adopted and new varieties produced which will suit the new climatic conditions.

In the north, the best wheat is produced, and the best honey, cheese, and butter, and when the same high standard of quality is demanded for fruit as for these articles, the men of the north will be able to furnish their share of fruit of the highest color and finest quality.

DISCUSSION.

Dr. W. Saunders, Director, Central Experimental Farm, Ottawa.

You who live in this favored section of the country can form little idea of the difficulties that surround the growing of fruit in the northern districts. Districts such as Leamington and Niagara, while highly important in themselves, are small in comparison to the vast extent of country to the north and west, to people which, earnest efforts are being made. We cannot all live in these favored spots, and hence should be willing to do what we can to help those who are less favored. To show you to what an extent the extreme north sections of the country are unacquainted with fruit, I was once travelling in the north with a member of the Geographical Survey, who had brought down a boy from the Hudson Bay Territory. When they approached civilization, they came to a turnip field, and my friend informed the boy that turnips were a nice kind of fruit. The boy gathered one and ate it, thinking it was one of the finest things he had ever tasted. On another occasion I met a family at Edmonton, who had come from the Mackenzie River, near Fort Peel. None of the children had ever seen an apple. I bought a few and handed them to them. They looked at the apples, but did not know what to do with them. Finally the youngest put his teeth in one of the specimens, and found it exceedingly good and began to eat it, the rest following suit. We have, coming into this country, thousands of persons who have little acquaintance with the fruits grown here. We want to educate these people to use fruit. We had last year between thirty and forty thousand people land in Canada from the northern countries of Europe, Galicians, Icelanders, Swedes and Norwegians, and a large proportion of whom known very little about fruit. One of the best ways to create in these people a taste for fruit is to place in their hands fruit trees of such varieties as they can grow for themselves. The more fruit a family consumes the more it wants. With this in view, early in the history of the experimental farms, earnest efforts were made to secure varieties hardy enough to be grown in Manitoba and the Northwest Territories. Every variety that promised to be hardy was tested at Brandon and Indian Head. This testing has been going on for sixteen years, but, although hundreds of varieties have been tried there, we have not yet grown an apple on either of these farms, until last year when we had a few Transcendent crabs. In 1886 we secured samples of the wild Siberian crab, with the expectation of having it as an ornamental shrub. Finding that it was perfectly hardy and gave crops of fruit every year in considerable quantities, the idea occurred to cross it with some of our best and hardiest sorts of apples and raise seedlings from these crosses and test them in that country. This work has been going on for eight or nine years. Two years ago I brought to this Association some of the results of this work and exhibited specimens of the fruit that had been obtained. The total number of crosses to date is about 800, of which about 150 have fruited. A large proportion of these are comparatively worthless, but in one case perhaps out of ten we get a fruit large enough and good enough to warrant its propagation for further test in the Northwest. These varieties, although grown in Ottawa, have been tested at Indian Head and Brandon and found perfectly hardy. Last year young trees of the best sorts were sent to points in the Northwest for co-operative tests, the places selected being arranged so as to cover the widest differences in altitude. As the farm at Indian Head is only 2,000 feet above sea level, it remains to be seen whether these fruits will be found hardy at higher altitudes. It is expected that they will, because the female plant has been found hardy throughout all the settled parts of the Northwest.

We have had several excellent sorts added to the list which have fruited since I last spoke on this subject. This year we had two new varieties which fruited for the first time. These are larger and better than anything we have hitherto had. The best sorts are being propagated, and will be distributed as far as possible, and I hope we shall be able to get some of our leading nurserymen sufficiently interested to propagate and distribute them, as this is a work rather belonging to them than to the Experimental Farms

In this way we hope to help the fruit growers of Ontario and the fruit growers living in other parts of the Dominion, by awakening a love for fruit among the large number of persons now settling in the Northwest, thus creating a demand for the better varieties which you will be able to send them.

We are carrying on experimental work with other fruits, but none are so important as the cross-bred apples, which are being produced for the North-West. I believe that in another ten years we shall be able to furnish fruits of such hardiness and quality as will permit of the growing of apples all through Northern Ontario up to James' Bay, and through Manitoba, Assiniboia, Alberta, and Saskatchewan. Whether we shall be able to carry them still further north remains to be seen. The outlook is very hopeful; the people who have come from fruit-growing countries are very anxious to get these fruits, so that they may be able to grow for themselves some part of the fruit they want to consume; but they will still be large customers for the better fruits of the east.

POWER SPRAYING.

By W. A. Mackinnon, Chief Fruit Division, Ottawa.

It should be clearly understood that at the present stage of horticultural development, the question no longer is whether spraying pays; spraying is admittedly essential if we are to have clean crops, and what we have now to consider is how best to accomplish the operation. Supposing that with all the advertising and discussion of past years, the public had become acquainted with the proper methods of spraying, that every farmer who had a small orchard understood properly how to spray—even supposing that state of affairs—difficulties would still remain. The farmer who has only a small orchard feels that it is rather too much to ask him to purchase a spraying outfit, or if he has an outfit, he often finds when he should use it that he is very busy, and puts it off. Many who have learned to believe in the operation and have purchased outfits do not use them properly, either because they do not use them at the right time or because they hand them over to men who care nothing about the details of the operation—who do not know that accuracy counts for everything, and that thoroughness is the only road to success. In such cases there are no results, and it is worse than if

THE YEARLY FIGHT FOR THE FRUIT CROP.

Now that spraying has come to be generally recognized as a necessity in successful fruit growing, the question what sprayer to buy is a serious one for many growers. The illustration shows a Power Sprayer at work in a peach orchard. This sprayer is highly spoken of by many growers. It is comparatively cheap, secures its power from the rear wheel, does not have to be recharged, requires no fuel, is not too heavy, and is reliable and not expensive to operate.

they had not sprayed at all, because the operation is discredited. These are some of the difficulties that occur in connection with ordinary spraying.

Considering and accepting the fact that mere education to induce spraying was a thing of the past, the Minister of Agriculture last spring authorized the Fruit Division to conduct a demonstration in power spraying, in order that the growers might see that by that method they can spray more efficiently and economically than by the old method, especially when labor is dear. In order to test the method, gasoline power outfits were sent to Woodstock and to Montreal. The spraying was not to be a mere demonstration of the use of the power pump, but a scientific experiment, continued throughout the season. The orchards were to be sprayed at least four times, and the farmers interested agreed to pay for the operation, the amount being fixed in advance.

In the case of Montreal, it happened that this year they had no fungous disease or Codling moth, and, therefore, we have nothing to show as the result of our work there. The greatest number of trees covered in one day was 800, the trees being of medium size and the soil not such as would facilitate quick work.

In the neighborhood of Woodstock some twenty orchards were accepted. These extended in a long, irregular line from Ingersoll to Woodstock, the total distance being about ten miles from end to end, and the route was, therefore, not best adapted to economic operation. The orchards were of all sizes and descriptions, so that the work was done under all sorts of conditions. The spraying outfit consisted of a two-and-a-half horsepower gasoline engine, two lines of hose with six nozzles each, and a tank containing 250 gallons. We used 1-4 inch hose for lightness. The size commonly used is half-inch; three-eighths or a quarter is much better; it is about eight times lighter when filled with liquid than half-inch. We used a wide-tired wagon, with low wheels in front to facilitate turning.

Altogether we had 8,790 "tree sprayings," and the average cost per tree for each spraying was rather over four cents. We had a most unsuitable route to follow, and had no thought from the first that we could make it an economic success. Then, our men were quite inexperienced with gasoline outfits, and time was lost and expense incurred, which will not be necessary another year.

Q.: Is that all in the four cents?

Mr. Mackinnon: Yes. I am not at all sure that I can say that power spraying will always be done at four cents. Some of the spray-pump catalogues will lead one to suppose that a fraction over two cents would do the work with hand power. I think this is very doubtful, and I should not care to promise that spraying will be done on an average at less than five cents for each application.

Q.: Are you referring to mature apple trees?

Mr. Mackinnon: Yes; peaches, plums and pears would take less time and material. You get a very fine spray with a power outfit. The spray is produced by 100 pounds of pressure constantly on the hose, and is, in fact, a mist, which will cover every part of the tree.

As regards results, I may say that in the sprayed orchards we had very great difficulty in finding scab or defective fruit. We had some remarkable examples of the way spraying benefited the crop. On one side of the road, in an orchard we sprayed, it was difficult to find defective fruit; on the other side of the road, where the orchard had not been sprayed, it was difficult to find clean, perfect fruit. In the orchard of Mr. Schell, Woodstock, which we sprayed, the results were very marked. Close to this orchard in a kitchen garden was a solitary tree, which could not be approached by the outfit owing to its location. The fruit from that tree was scabby and small, and lacked color. We cannot attribute all that to lack of spraying, but the operation undoubtedly prevented scab on the neighboring trees. In another instance the tree was situated very close to the house, so that one side of it was sprayed and the other untouched. The difference in the quality of the fruit on the opposite sides of the tree was most remarkable.

Mr. Schell has given me a letter containing his opinion on the results of the operation, which reads as follows:

Extract from letter from M. & W. Schell, Woodstock, Ont.:

"(1) When the one outfit is used for a number of orchards we would favor the use of a gasoline engine. We do not think the work is any more efficiently done than could be done by hand. It is simply a matter of economy in the saving of labor. To do a reasonably-sized orchard we would consider two men necessary on the pump to make proper headway and to keep up sufficient force.

"(2) My own crop of apples was certainly as clean as anyone could reasonably wish. It was necessary in most cases to look to find spotted apples. The Northern Spies, which are usually liable to spot, were exceptionally clean and bright, and far superior to anything in the neighborhood that was unsprayed.

"(3) I have no doubt it paid to have spraying done. It is almost sure death to the Codling moth."

Q.: How many times do you consider it necessary to spray?

Mr. Mackinnon: That will depend on the season. If you had cold and wet weather, the spraying should be continued frequently, as under such conditions the scab is late in developing. Four sprayings should be plenty in ordinary seasons.

Q.: At what dates?

Mr. Mackinnon: Before the buds open, just before the blossoms open, shortly after they fall, and ten days or two weeks later.

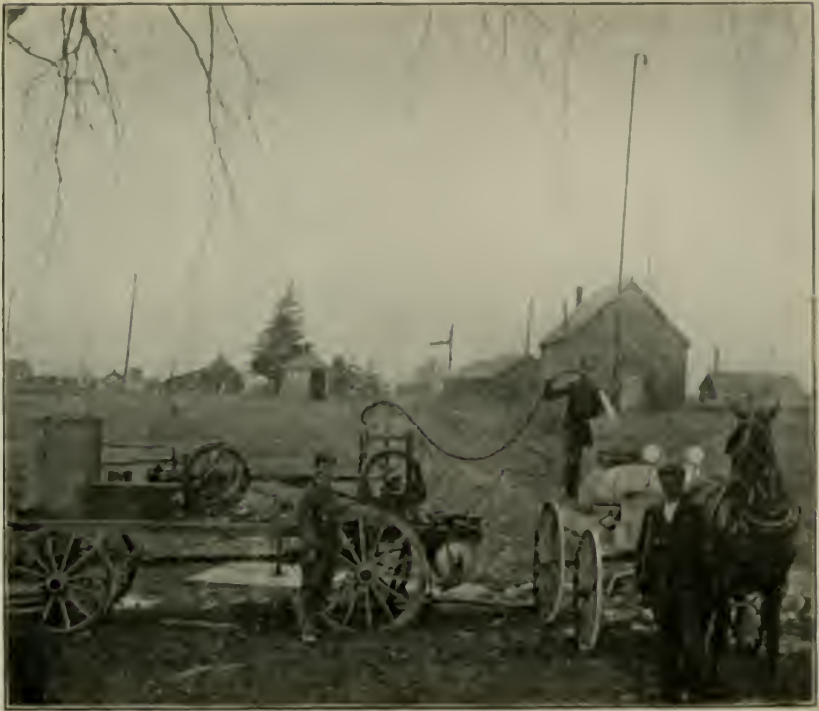
My object in addressing you is not merely to lay before you the results of some of the work of the Fruit Division, but it is chiefly with the hope that you will do something yourselves towards encouraging the use of power spraying. We all know that people who belong to Horticultural Societies do attend to these things fairly well, but there is a vast army of farmers who have small orchards, and it is from those orchards that a large quantity of our export fruit comes. My thought is that the members of this Asssociation should become missionaries, and induce these small owners to spray their orchards so that they will be able to market clean fruit. We shall never glut the market with good fruit, but the trouble is that we put upon the market along with our good fruit large quantities of inferior stuff. If the spraying operation is performed five times and costs five cents per tree, you have invested twenty-five cents in each tree. If the trees are fully grown, what is a fair average crop? Suppose it is only one barrel, can you make 25 cents by having that fruit clean? What is the difference between No. 1 fruit and inferior fruit in the market? Fifty cents, seventy-five cents, or a dollar. Will the members or directors of this Association constitute themselves missionaries or supervisors of their less well-informed brethren, each in his own district, and urge the adoption of methods that will lead to the production of clean fruit? Induce the farmers to unite to purchase power outfits, which cost about $350, including the wagon, and to employ one man to each outfit who understands or will study the proper methods of spraying—who will know how to mix and properly apply the compounds, so that instead of each farmer having to face the problem of getting a skilled man or throwing his money away by doing the work improperly, one skilled man will act for a group of them. I hope the Association will adopt this suggestion in some form. We have got past the day when we have to instruct our growers what varieties to plant. We know what to grow and how to grow it, and what we require is to get rid of the culls, which are eating up our profits, and then to place our fruit on the market in an attractive form.

Mr. Barber: This is a question that has interested me for a number of years. My trees are coming more and more into bearing. I have a good hand-power sprayer; shall I continue with it for a year or two, with the prospect that at the end of that time the power method will be more perfect than at present?

Mr. Mackinnon: I cannot say we have arrived at perfection in power spraying, but it is not new on the other side of the line. No doubt, improvements will be made from time to time. My opinion is that it would pay you to dispose of the hand-power and substitute a power sprayer, if you have the requisite number of trees.

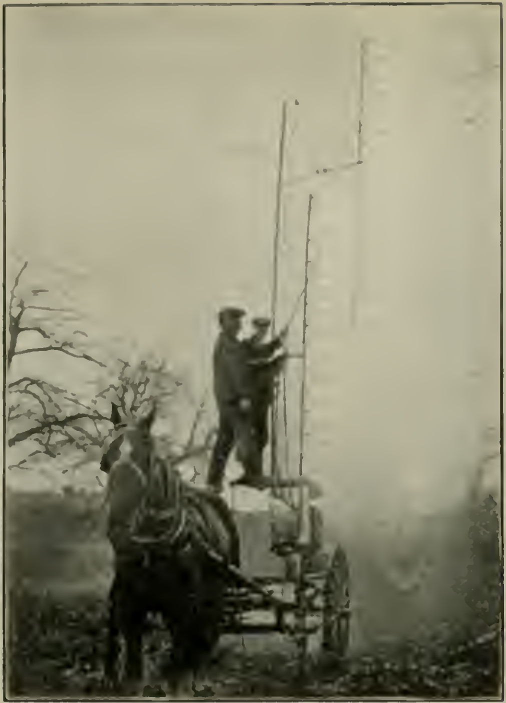
Mr. Barber: I have about three thousand trees.

Mr. MacKinnon: I would think that would keep an outfit busy.



COMPRESSED AIR SPRAYER BEING LOADED. No. 1.

The illustration shows a gasoline engine compressing the air into one of two tanks on the waggon and filling the second tank with the mixture to be used. The tanks contain about 100 gallons each, and it takes 10 to 15 minutes to fill them. The air tanks are charged up to 160 to 180 pounds pressure to the inch. When this compressed air is turned into the tank containing the mixture the liquid is forced out in the form of a fine spray.



COMPRESSED AIR SPRAYER AT WORK. NO. 2.

A large orchard can be effectively sprayed in a short time by one of these sprayers equipped with a spar as here shown. This spar is adjustable and can be moved when desired, until the upper part is entirely above the lower, thus not duplicating the spray. The gasoline engine, used to load the tanks, is usually kept at the nearest point to the orchard where a good supply of water can be obtained.

Mr. Owen, Catawba Island, Ohio: Early last spring I introduced a compressed air outfit, and to me it has solved the problem of spraying to a great extent, and has taken the bugaboo away from it. Such an outfit consists only of an air compressor and two tanks for the waggon and a storage air tank. The outfit is very simple. You go into the orchard with two tanks on the wagon, and no expensive, bulky machinery to get out of order. One man does all the work. I operate a cluster nozzle and spraying spar. They are operated from a platform at the back of the wagon, where the operator stands. The tank holds 130 gallons. My remarks apply particularly to the spraying of peach trees. A peach tree of the ordinary size can be sprayed thoroughly from one side with a strong wind with about three passes at it with a cluster nozzle. To do away with some of the labor, I got up a spray spar with twelve nozzles distributed at intervals up the spar. I use a Niagara nozzle with a flat spray, and thus obtain with this apparatus a solid bank of spray. In this way we are able to spray as rapidly as the horse can walk, and with a strong wind one man can spray twenty acres of peaches per day without difficulty with a single rig. With me it was a question of labor, and I had to get something to help me to do the work. from the fact that we have to pay twenty cents per hour for a good practical sprayer, and it came to a point this spring when we could scarcely get them at any price. This system has proved so successful that seven or eight central stations have started up. These co-operative associations are getting the plants and doing the spraying for their members. You need only one man at the pumping station; he pumps up the compressor and does the mixing; and one man in the orchard who will keep three rigs going and spray out a wonderful lot of mixture. He will do more than twelve men, or four rigs which employ three men each, and do better work. The spraying spar will not miss one small twig, and will not waste the material, while with the individual nozzle you often go over the same limbs two or three times.

Q.: How far do the nozzles extend from the spar?

Mr. Owen: They are right on the spar.

Q.: What is the cost?

Mr. Owen: I have had to fight the San Jose Scale, using the lime, sulphur and salt solution. For that I have used a steam boiler and engine rather than gasoline. You can run the air compressor with a gasoline engine. I have a steam boiler and air compressor, and can keep as many rigs going as we want; I should recommend three rigs for large commercial orchards. Many of our people are taking up spraying as a business. With the lime, sulphur and salt mixture they charge about three cents a gallon made and applied. The outlay for such a plant, including steam boiler, rigs and all, would probably be from $600 to $800. My plant has cost me a little over a thousand dollars, but I went to a lot of expense in experimenting which you could probably avoid.

INSECTS AND FUNGOUS DISEASES OF 1903.

By Dr. James Fletcher, Ottawa.

The subject of my address to-night, ladies and gentlemen, and boys and girls, is the insect and fungous diseases which every year cost this country a great deal of money. Of every crop that grows the farmer loses, every year, nearly one-fifth of the profit, from causes which can be largely prevented, but which are not to the extent they ought to be. This year has been a particular exception to this rule. It is not advisable to-night to go into any great detail, but I must speak in rather a general way. The losses during the past year to the fruit grower were chiefly due to old and well-known pests, which, unfortunately for them, many of our fruit growers think they know all about. The most important of these was the San Jose Scale. Do not let any Ontario farmer allow the wool to be pulled over his eyes by the statement, too frequently made, that "we can manage that all right." Do not believe that you have any cause to feel that you can deal with the San Jose Scale without a great deal of trouble. From all we know, and we know more than we ever did before, the San Jose Scale is a scourge that is robbing Ontario of many thousands of dollars every year. Within the last week I saw the statement that half the fruit trees in the United States would eventually be destroyed by the scale. Let us ask, then, have we a remedy? I answer decidedly, yes. We have a good, practical remedy, if farmers will only use it.

We began a discussion this afternoon as to the way to spray, and as to whether it paid to spray or not. There is not a successful fruit grower in this Association but knows that it does pay, and pays enormously, and makes exactly the difference between profit and loss in the Ontario orchards. It is worth the while of the members of this Association, and every one dependent on this industry in which such enormous sums are invested, to know that the San Jose Scale can be controlled if people do what they know they ought to do for their own sakes. Should the fruit grower not spray when he knows that he will lose money by not doing so? Should he be so foolish as to say he has not time to do it? Is there any man in business who will say that he has not time to make money? That is exactly a parallel case with a fruit grower, when he can prove to himself that he can save money if he does this and all other parts of his work in the best way. But all will see that the man who will plant an orchard and cultivate it and prune it for years is not a good business man if he neglects two or three days' work in the spring spraying at the crucial time which determines whether his labor is to return him any profit or not for that year at least. We discussed today whether it was four or five cents per tree that the cost of the treatment came to. That should not have been the discussion, for even if it costs fifty cents per tree, we could make one hundred and fifty per cent. by the investment.

Dr. Mills, in his address last evening, drew your attention to four or five matters that were of great importance to fruit growers, and among them he pointed out the importance of the work of spraying being thoroughly done. Most people who spray do not spray at all. What is a spray? It is mist—liquid broken into such minute particles that it falls as an actual spray or mist, and yet the farmer who is going to spray, in many instances gets the cheapest pump that will throw liquid in any sort of way on to his trees, and then expects to get the best results. He must get the best implements in the market, and get the best men, or see to it himself that it is properly done. It must be done well and thoroughly, so that the whole tree is covered. Then, spraying is not a general panacea which will cure all ills. There are different kinds of pests and different kinds of materials to be used, and these must be understood by the fruit grower before he can get the best results. We have different kinds of fungi, those that work from the inside and those that work from the outside, and different remedies are necessary for each. Some insects eat up the substance of the foliage, and require special remedies; others suck up the sap, and the tree may be said to die for want of its blood. All must be treated in their own special way. Fortunately for the farmers there are many general remedies that may be used for several of these pests at the same time.

In speaking of the San Jose Scale, I will say that the one remedy that up to the present has, on the whole, given the best results is the lime and sulphur wash. This is the most practical remedy to use for the reason that it not only destroys the San Jose Scale and many kinds of insects, but at the same time many kinds of fungous diseases as well. It is rather troublesome to make, but with improved machinery and the knowledge which has been distributed all through the Province by the officials of both Governments, the men most concerned are learning more and more every day about this work. A recent discovery has been made that the long and tedious operation of boiling this mixture for two or three hours to dissolve the sulphur has been obviated by the use of caustic soda when making the wash. For a few minutes let me refer to that great advance in education which has recently come so much to the front, namely, what is known as "nature study." Nature study is the training of boys and girls to be useful men and women—good citizens—by teaching them to use their eyes and their minds at the same time—to look at a thing and to see it when they are looking at it; teaching them not about natural history, but to see that things differ from one another; to sharpen up their eyes and their minds so that they can think for themselves about every problem that comes before them in their ordinary lives; teaching boys and girls to be wide awake, and therefore to be more useful men and women. The object of nature study is not to train scientists, but to lay the foundation for making good, strong men and women, whether they are to be parsons, lawyers, doctors, farmers, or merchants, all who engage in the ordinary vocations of life. The boys and girls of to-day have a better chance than their fathers and mothers had to be useful Canadians. With these increased opportunities they must not forget that they have greater responsibilities. You as fruit growers who attend this convention have something demanded of you. You were appealed to by Mr. Pattullo, as a body, to seek to improve your own gardens, and by that means to exemplify to the city or the surrounding country where you live what may be done by each one to help to improve and beautify the whole district where he lives. In your work as fruit growers you know, every one of you, that you ought to spray your trees regularly if you hope to control the regular insect and fungous enemies, so as to get the fullest returns for your work. You are sometimes very busy at the time this ought to be done, and it is difficult. Of course it is; most things that are worth doing are troublesome. That is not the chief consideration. What we have to decide is, Does it pay? In reply to this I say very emphatically, Yes, it does, and most abundantly!

I saw in The Globe yesterday an account of the crops of Ontario for the past season. It was stated that there was an average for the Province of two barrels of apples to the tree. You as fruit growers know that that is not at all a large estimate. Let us put it down that the grower this year makes a profit of one dollar on each barrel. Suppose he spends fifty cents in proctecting every tree from insect and disease, he would still have $1.50 profit; but if, on the other hand, he does not spray, we know that there is in most instances nothing at all. Let me tell you that a few years ago the orchards at the Experimental Farm containing all the leading varieties, including many which are subject to disease, as McIntosh and Fameuse apples, many of these were infested with black spot and oyster-shell bark louse, but by persistent spraying in the proper way, the horticulturist, Mr. Macoun, has brought that orchard to the condition that I do not believe there were a dozen spotted apples in that orchard this year. I did not actually see one. Those trees are now also practically clean of the oyster-shell bark louse. Now, why is this the case? Because the nature of that pest was studied and understood, and the proper remedies were applied accordingly. A few words on another burning subject.

What is the condition of Ontario to-day in regard to the San Jose Scale? It is worse than it was this day last year, because the special spraying for this pest has not been done vigorously enough. Providentially this scourge has not spread very far through the Province, but in the infested area and in individual orchards the scale is spreading very rapidly, and it is to-day a menace of great magnitude to our orchards. There is a practical remedy, and it behoves the fruit growers to apply it. I would advise you to pin your faith to one remedy which you know is good, until you find a better. That remedy is the lime, sulphur and salt wash. Systematic and regular work every year, even in orchards that are badly infested, will bring down the infestation so that your trees will continue to grow in a thrifty manner and to yield crops of fruit. But you must not stop for a single season, or your enemy will increase very rapidly.

That is not the only pest; the oyster-shell bark louse, which is a pest on apple trees in every part of Canada, may be cleaned off by the same wash. This insect can also be easily treated by spraying early in the winter with a simple lime wash, one pound of fresh lime in each gallon of water. Common sense will help us in all these operations. For instance, in using this wash it is easier and more effective to apply two thin washes, the second to be put on after the first is dry, than to apply one thick wash.

The Scurfy Bark Louse can also be treated on apples with the lime, sulphur and salt wash, and it is almost, if not quite, as good a remedy for the black spot of the apple as the Bordeaux mixture.

The Cherry Aphis has given a great deal of trouble in this district. This is a representative of the class known as the black plant lice. There are black colored plant lice, and also green ones. The practical difference to the fruit grower is this, that they must use a stronger remedy for the black than for the green lice. For the green lice use one pound of whale oil soap in six gallons of water, and for the black the same quantity of soap in four gallons of water. Many plant lice have the habit of living on two different kinds of trees at different seasons. The hop aphis, for example, lives only on the hop plant while that is above the ground. This plant develops only late in the season. What are the insects to do in the first and latter part of the year ? It has been discovered that their habit of life is not to lay their eggs on the hop at all, but on plum trees. Therefore, one good remedy is to spray plum trees near hop fields to destroy the eggs of the Hop Aphis.

Similarly, the apple aphis in the hot summer weather leaves the apple tree and flies to the grass. Although they are not seen on the apple tree at that season, they have not all died, as some might think ; they have simply gone to other plants, and later in the season they will swarm back to the apple trees and lay their eggs there. The practical point for the fruit grower is to know that the eggs may be destroyed by spraying with whale oil soap or kerosene emulsion.

I do not suppose there is any country in the world where such complete spraying experiments have been paid for by the Government as in your own Province ; but the time has come when you must take the matter into your own hands, realizing that much has been done for you, and that, therefore, much is required of you.

I think that perhaps the fruit growers of Ontario may have had a little too much done for them ; they have not been thrown on their own resources enough. The man who has done his own work knows what he has done and why he has done it.

There are a great many kinds of injurious insects that may attack your crops, yet the amount of knowledge you must have in order to combat them is very small—merely some general knowledge of the nature of insect pests. The first enquiry a farmer should make when he finds that his crops are not succeeding is, What is the nature of the injury ? Then, if he can determine what sort of insect is at work, he will be able to apply a general remedy until he gets definite information from some one else who has had more experience. Definite knowledge must come from a definite knowledge of the habits of an insect. One of the commonest mistakes made is to suppose that Paris green will destroy everything. I get hundreds of letters every year saying, "I send you a certain insect ; have applied Paris green, but it does not seem to do much good." In nearly every instance I find that the insect is a plant louse or a similar insect, for which Paris green would not have the slightest effect. Paris green is not a general remedy ; it is a strong active poison, which when placed upon the food of any animal will kill that animal if it eats it ; but it will not kill those insects that do not eat the substance of the plant they live on but simply suck the sap from below the surface. The remedies for such insects are whale oil soap, kerosene emulsion or some oily substance which runs over the body of the insect and stops up its breathing pores, and kills the insect in that way. The lime and sulphur wash is partly of this nature. In the case of the San Jose Scale, the remedies eat their way or soak through the waxy scale which protects the insect and get at the insect underneath. It is because of this shield or covering that the San Jase Scale is so difficult to fight against. There are special remedies for the different classes of insects. These must be found out, and the most practical remedy is the one which does the work best at the lowest cost. The fruit growers' watchword is, "Be constantly on the alert ; begin early and do everything thoroughly."

A SEASON'S OBSERVATIONS IN THE PEACH ORCHARDS OF GEORGIA.

By A. B. Cutting, O.A.C., Guelph.

During the past season I had the privilege and the pleasure of visiting some of the great peach orchards of Georgia. Previous to my visit, I imagined that I possessed a fair knowledge of peaches and of the peach industry; while in Georgia I discovered that I did not know quite so much as I thought I did, and I learned that the more one learns about peaches the more there is to learn. Since my return to Canada I find that I did not learn all that there was to learn, nor did I learn all that I might have learned; and now, after listening to the very interesting and instructive addresses of Prof. Taft, of Michigan, and Mr. Owen, of Ohio, yesterday, and after hearing the report of Mr. Hilborn, of Leamington, to-day, I am at a loss to know what I know about peaches anyway. In fact, the more I see and the more I hear and learn of peaches, the wider the subject grows and the farther away it appears to recede from my grasp. At any rate, I do not profess to be an expert or authority on peaches. I am here simply to give you a few ideas that were pointed out to me in Georgia.

In the course of my observations I looked into nearly all the phases of the industry. I gleaned pointers on nursery practice, on laying out and planting the orchard, on cultivation, pruning, spraying, harvesting, marketing, disposing of the surplus fruit, manufacturing and handling the by-products, transportation, etc., and in doing so I visited a large number of orchards; but as time presses I shall confine my remarks to the handling of the ripened fruit, the picking, grading, packing, shipping and marketing as carried on in that country. In particular, I shall refer to the methods practiced in the great Hale orchards, where a wide-awake intensive system, on an extensive plan, is carried out.

The Hale Georgia Orchard Company's plantation at Fort Valley, Ga., comprises about 2,000 acres, planted with 25,000 plum trees, all Japan varieties, and 350,000 peach trees, of which 250,000 are fruiting. It is laid out in blocks of 500 x 1,000 feet, with broad avenues named after the various States and nearly three miles long running north and south. and cross streets named after leading horticulturists. In the height of the season 700 people and 100 horses and mules are required to harvest and ship the crop.

When viewing the orchards from a nearby hill, the buildings thereon appear like unto a great city in miniature. Besides the residence of the superintendent there are thirty-six tenement houses right in the orchard, and at fruiting time scores of tents for itinerant fruit workers. A large hotel, known as the "Red Label," accommodates about two hundred.

To describe all the buildings and all the features of the Hale orchards would be a weary task; weary not to the speaker, perhaps, but to his hearers. For this reason I shall do away with comments and content myself and you with merely a brief list of what may be seen at Hale's, the largest peach orchard in the world. In addition to the buildings already mentioned, there are two large packing houses, a large storehouse for empty crates, an office for the timekeeper, an evaporating plant, a grafting house, a blacksmith shop, a carpenter shop, an implement shed, a carriage house. four barns for horses and mules, a building for storing fertilizers, a school house for colored children, hall for colored employees and a colored restaurant.

Among other features of particular interest, a few of the most novel and striking are as follows:

Every year about ten acres of melons and cantaloupes are grown for the employees. These, when ripe, are distributed every morning and evening free to each and every person connected with the orchard.

Policemen are employed to guard the melon and peach plantations during the day, and to keep a general watch over the entire property at night. One of the duties of the night policemen is to enforce the rule: "Lights out at 9 p.m."

A colored school teacher and a colored preacher are included in "Hale's 700." The employment of these two persons tends somewhat to colonize the colored help, and as a consequence, less trouble and annoyance is experienced by the Hale Company in the management of their labor

Hale operates and owns a private road machine for making and repairing the avenues and streets of the orchard, which are 40 to 50 miles in length.

In the past and at the present time ordinary large fruit wagons, known as "floats," and drawn by mules, have been used to transport the peaches from the orchard to the packing houses. Next year it is proposed to test the feasibility of using automobiles. Just now a truck automobile is being built for use in the Hale orchards next summer. If the trial proves satisfactory, the mule, the horseless carriage of the south, must give way on the Hale plantation to the automobile, the horseless carriage of the north.

During the fruiting season a string orchestra is engaged to brighten the work of grading and packing in the packing house. Midway in the afternoon, when the rush of an abundant crop has made weary the day's work, the quickening strains of rag-time incite in the hearts and the nimble fingers of the packers a renewed spirit and a fresh vigor. The cost of operating this Georgia orchard for the season of about six weeks amounts to over $3,000 each day.

PICKING.

Before leaving for the orchard in the morning, each picker is given a sack containing a number of tickets, each ticket bearing the number of the picker to whom it belongs. In the orchard the picker places a ticket in each basket of peaches that he picks.

When the fruit reaches the grader in the shed, he takes care of the tickets that he finds in the bottom of the baskets and gives them to the timekeeper.

The timekeeper credits the grader with the quantity of tickets that he (the grader) has gathered from the baskets, and credits the pickers with the quantity of tickets received bearing that individual picker's number; hence, one lot of tickets suffices for both pickers and graders.

The pickers (packers and graders also) are paid so much per day, with advantage of increase over average number of baskets picked or crates packed during the day.

For example, Hale pays his packers $1.00 per day for the average number of crates packed that day. If the average for that day happens to be fifty crates, each packer receives two cents per crate for the work he has done. The packer who has packed over 50 (the average) is paid at the rate of two cents per crate, and the one who has packed less than the average receives a corresponding decrease. The following day the variety and grade of peaches being packed may be larger or smaller as the case may be; if the former, the average will be higher, and the packers will receive a lower rate per crate, or if the latter, a relatively low average will be the result and a correspondingly high rate per crate.

This system of paying the fruit workers—known as the "average system," is satisfactory both to employer and employee. The former gets more work done for less money than he could by any other system of payment, and the employee who is a little better than the other fellow feels that his efforts are being substantially recognized. Personally, I may say that at first I thought the system unfair to the employee, and it certainly would be if all the packers were experts, as then the average would always be high; but, after talking with the packers, I found that all appeared to be pleased and satisfied with the method on account of the fact that every day new and inexperienced hands are employed who tend to keep down the average, and enable thereby the best workers to make a good showing above the average for the day.

To fully illustrate the advantage of the system to the employer, I noted, on a particular day, the difference between the results of this system and those of a system practiced on a neighboring orchard.

Hales, 80 crates for $1.00 (average system).

Neighbor, 40 crates for $1.00 (day system).

I have referred to the packers and packing for convenience in explaining the system, not because they alone are paid in this way. Such is not the case, as the same method is used in paying the pickers and the graders, and with the same degree of satisfaction and success.

Handling the Pickers in the Orchard.—Over every twenty-five pickers is one foreman, with assistant if necessary. To prevent delay, each picker carries a couple of baskets to the orchard where they are started picking, one picker to a row. When picking, a ticket is first placed in the basket, then the peaches, and when the basket is full it is left under the tree. The baskets are then carried by boys to convenient places for loading on single-horse orchard waggons (known in Georgia as "Dunkirks"), which go about among the trees gathering up the baskets and carrying them to the avenues, where they are transferred to larger waggons ("floats," before mentioned) that ply between the orchard and the packing shed.

These floats leave the barns loaded with empty baskets in the morning. In the orchard the empties are distributed by basket boys, who should keep ahead of the pickers to prevent loss of time. Four or five basket boys are required for twenty-five pickers. Two boys are also employed to keep pickers supplied with drinking water. This is merely an outline of the orchard practice, and may not be suited to all conditions, as at all times and in all orchards it is necessary to adjust labor to suit existing circumstances.

The trees are gone over two or three times to get the fruit at the proper stage of maturity. Practice soon teaches the pickers the proper stage for picking. In general the fruit is in the right condition when it is full grown but yet firm, and when the ground color takes on a faint yellowish tinge.

Q.: Do they pick from ladders?

Mr. Cutting: No; all the trees are picked from the ground; they are very low-headed.

GRADING.

Each packer has a grader, who grades the peaches according to variety. Each variety is usually assorted into three grades, each grade being marked in accordance with the grade mark chosen by the grower, as there have been no uniform marks adopted as yet in Georgia. Hale marks the first grade Extra Fancy; second, Fancy; the third the name of the variety only. Thus:

No. 1—X Fancy Carman.

No. 2—Fancy Carman.

No. 3—Carman.

Sometimes a fourth grade is made and marked "Choice"; i.e., a size that is midway between Nos. 2 and 3.

The graders are constantly watched and instructed by experts. All ill-shaped, bruised, rotten and very small peaches are thrown out and sent to the distillery. The best of them may be used in the cannery or evaporating plant.

As a rule the Georgia growers prefer hand-grading to machines. Mr. S. H. Rumph, of Marshallville, Ga., the originator of the Elberta peach, favors the mechanical grader, and has a number of them in operation that do very good work. They are made by Messrs. Maull & Miller, Crescent City, Fla. Personally, I noticed that this particular grader was all right, as far as the assortment of sizes was concerned, but it failed to reject the bruised and bad-shaped fruit, and, besides, I was rather disappointed with its speed. I would not presume to condemn it, however, as I may not have seen it under favorable conditions. Hale says this is probably the best grader made, but all are unsatisfactory.

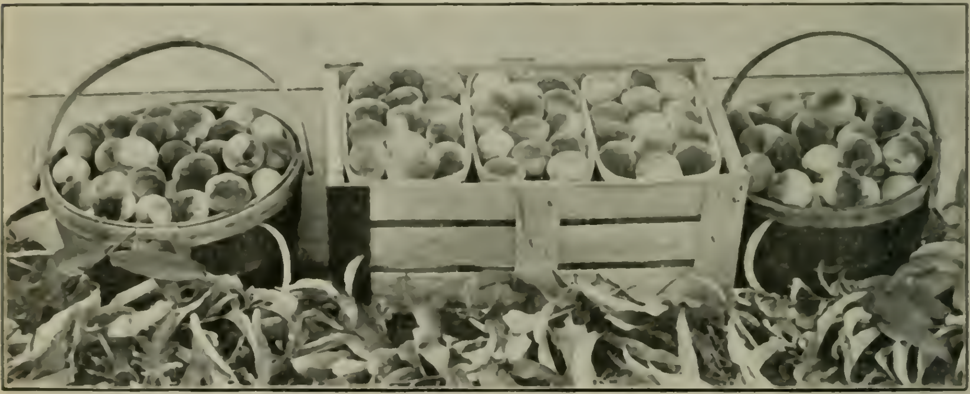
Under the head of picking we have already considered the method of keeping tally with and paying the graders.

PACKING.

Hale uses different packs for the different varieties and grades, the size of the peach determining the pack to use, and all his peaches are packed in the standard six basket Georgia carrier. As it is rather difficult to explain verbally or in writing the various packs used, I shall now practically demonstrate the methods as far as possible, and, if desired, I shall furnish cuts for insertion in the annual report of the Fruit Growers' Association.

For sizes or grades that make three layers in a basket or "cup" of the carrier, a 2-2, a 3-2, or a 3-3 pack may be used. For four layers, a 4-3 or a 4-4 pack can be used, but it seldom pays to systematically pack peaches of this size. For two layers (usually first grade) it is best and necessary in most cases to use a 2-1 pack, although sometimes to make the cup high enough it is necessary to place the bottom layer on end.

With some varieties and grades it is often necessary to use a different pack in the bottom row than is used in the upper cups; e.g., X Fancy Hiley.



Picking Baskets and Carrier of second grade Elbertas, showing a 2-1 pack
(Photo. by G. H. Powell, Department of Agriculture, Washington.)

Bottom row, 2-2 pack, 3 layers, peaches packed flat.

Upper row, 2-1 pack, 2 layers, under on end, upper on side.

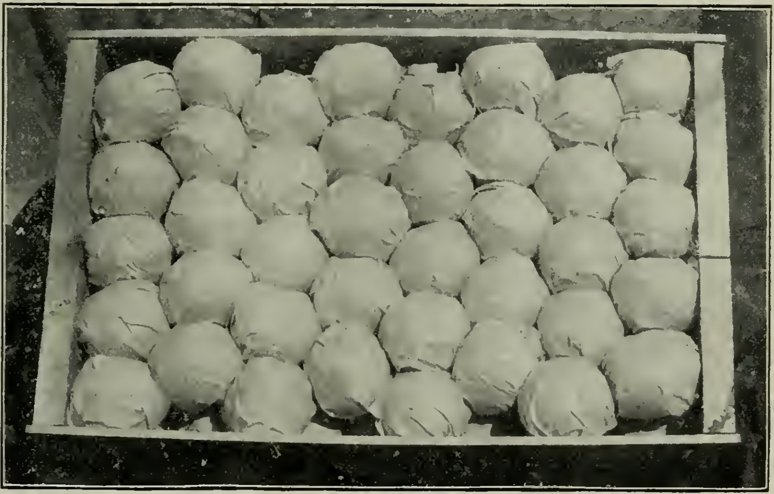
The carriers used for grades Nos. 1 and 2 are neatly labelled. No. 3 goes into plain crates, having no mark other than the name of the variety. In all of them the peaches are firmly packed to prevent change of position and bruising while in transit. The rosy cheek of the peach is placed uppermost, and the peaches are all pointed the same way in the cup. When the carrier is filled, the packer puts a ticket on it and sends it to the nailing table, where it is inspected. If found satisfactory the cover is nailed on immediately and it is carried to the car; if not packed to suit the inspector, it is sent back to be repacked by the packer, whose number corresponds to the number found on the ticket.

Some growers use what is termed a "spring" pack; i.e., a full layer on the bottom of the cup, a partial layer in the centre and another full one on top. In reality, it is a false pack, and one that is unsatisfactory, as it is liable to become loose before it reaches the market. Other growers use a two-layer pack, with both layers on end. Peaches packed in this manner are apt to become crushed through pressure of the crate top on the tender end of the peach.

THE GEORGIA CARRIER.

In Georgia they use a light carrier containing six baskets holding four quarts each. It is a very strong package, gives good ventilation, is neat in appearance, and costs only twelve cents with the divider, six baskets and cover. It is put together with strong wire staples well clinched on the inside. The panel heads afford a sure grip to the hands, and damage from breakage rarely occurs. When loaded in cars, the shape of the package permits a perfect fit; the tiers are separated for ventilation by means of inch slats tacked across the ends of the packages.

Yesterday Prof. Taft. referred to this carrier in connection with his remarks on the packing of fancy peaches in Michigan. Nearly all the southern States have adopted it. Texas, a coming peach State, and where to-day thousands of acres are being planted, adopted it at the outset. I intend to introduce it in the Argentine Republic, where in a few months I expect to direct the planting of a large orchard. In Canada, where no uniform peach and plum package has yet been adopted, it should receive the closest examination and the consideration of each and every grower. Even though it would cost more to make it in the north than in Georgia, the package would be cheap at twice the price mentioned.



Peaches wrapped for Export.
(Photo. by G. H. Powell, Department of Agriculture, Washington.)

WRAPPING PEACHES.

Experience is teaching the Georgia grower that it pays to wrap peaches. It prevents bruising and the spread of Monilia (brown rot), adds to the appearance of the package, and, above all, it increases the profits. Trial shipments repeatedly have brought fifty cents per carrier more than for unwrapped. This is worth considering, when the extra cost to wrap a carrier amounts to no more than six cents. Fairly heavy paper has given better results than light.

One report from New York last season stated that in carriers that contained unwrapped peaches, 10 to 15 per cent. were bad, while only 3 per cent. were bad in carriers that were wrapped

Wrapping seems to add or bring out the color. Mr. Hale says: "Wrapping is decidedly the best paper for soundness and color." Next season he expects to wrap a large portion of his output Other growers in middle Georgia and most of those in the northern part of the State are planning to do the same.

In cold storage, the effect of wrapping is not so noticeable on peaches as on other classes of fruit, mainly because peaches as a rule are not stored long enough for any advantages to be well marked. Experiments show, however, that wrapped peaches retain their firmness and brightness longer, and are less apt to show a discoloration of their compressed sides when removed.

SHIPPING.

At the Hale orchards the carriers are loaded into the cars at the packing house, and through trains carry them to New York and all points in the north. A fast schedule is arranged for these trains to deliver the fruit on the market in the best possible condition. The cars are iced three times between Fort Valley and New York. Cars 30 feet long loaded about two thirds full carry 500 carriers 5 tiers high; in wet seasons, one tier less.

There are many different types of refrigerator cars now in use, some with the ice chamber on the end, some iced overhead and others iced in various ways; none are entirely satisfactory. The objection to them lies not in the method of icing alone, but in the lack of proper ventilation, and, as a consequence, it is difficult to maintain an even temperature. Investigations show that different temperatures are found in different styles of cars and in cars of the same style. As a rule, the temperature at the top of the car ranges ten degrees higher than that at the bottom. This, aided by the moisture thrown off from the fresh peaches, is favorable to the spread of brown rot, and should be remedied.

Quick refrigeration is essential to prevent the spread of this fungus, which can do so much damage in twenty-four hours. No refrigerator car yet constructed, whether in Canada or the United States, can give quick refrigeration. For this reason, it is advisable, when possible, to have the fruit cooled before it enters the car. Furthermore, the fruit can be picked in better condition, riper and more mature. A local cold storage plant adjoining packing house into which the fruit could be placed and cooled before it goes into the car should be considered a part of the equipment of our up-to-date orchards. Such is feasible, however, only on large plantations or in connection with Mr. Owen's suggested co-operative central packing house.

MARKETING.

Mr. Hale ships to only one commission house in the same market. By doing so, he does not compete against himself, and, by careful grading and honest packing, his fruit is often sold before it reaches the market. He keeps in close touch with his commission man and with the market generally. He uses a private telegraph code to make communication secret and to lessen the expense of telegraphing.

Some markets prefer a yellow-fleshed peach to a white, and vice versa; e.g., New York favors the yellow, while Philadelphia prefers the white. Large peaches do not always bring the most money; as a rule, they bring less. On many occasions I have known second grade Elbertas to sell for twenty-five cents and more per carrier over the same day's quotation for first grade. Georgia peaches always bring top prices in all markets.

THE SURPLUS AND BY-PRODUCTS.

The question of handling to advantage the surplus and by-products of the peach industry is a most important one to all orchardists. There is no necessity for the grower to suffer loss in seasons of abundant crops when there are so many ways in which the surplus fruit, both good and bad, may be saved from the hog pen and the compost. Numerous and varied methods are resorted to in Georgia and elsewhere. I have time only for a list, which is as follows:

Commercial canning, home canning; peach pulp, jelly, jam and "butter"; evaporating and drying; crystallized peaches; distilling, peach brandy, wine and vinegar; pits sold to nurserymen.

FIRE BLIGHT.

By F. C. Harrison, Professor of Bacteriology, Agricultural College, Guelph.

"That species of blight which is sometimes called the 'fire blight' frequently destroys trees in the fullest apparent vigor and health, in a few hours turning the leaves suddenly brown as if they had passed through a hot flame, and causing a morbid matter to exude from the pores of the bark of a black, ferruginous appearance. This happens throughout the whole course of the warm season. More frequently in weather both hot and moist." So wrote William Coxe in a book on the "Cultivation of Fruit Trees," published in 1817, which is said to be the oldest American book on fruit culture.

Nearly forty years before this we have a record of the disease mentioned in a letter written by one, William Denning, who first saw the disease in the Highlands of the Hudson, in 1770. He described the disease fairly well and thought it was due to a borer in the trunk of the tree.

From 1817 almost to the present time, we find in horticultural literature many theories as to the cause of the blight. It would be tedious to give an account of all the different theories put forward by various writers during this period. The most diverse views were entertained as to the cause of the disease and it was a constant topic for discussion in the horticultural journals and societies. These discussions were so wearisome and so barren of results that the Western New York Society resolved that the subject should not be discussed at their meetings unless some one had something entirely new concerning the disease to communicate.

Amongst the numerous theories put forward to explain the cause of pear blight, we may mention the following:

1. Insects.
2. Rays of the sun passing through vapors.
3. Poor or deleterious soil.
4. Violent changes of the temperature of the air, or the moisture in the soil.
5. Sudden change from sod to high tillage resulting in surfeit or over plus of sap.
6. The effects of age; old varieties being most subject to it.
7. Autumn freezing of unripe wood, which engendered a poison that destroyed the shoots and branches in the following season.
8. Electricity, or atmospheric influence.
9. Freezing of the sap, or freezing of the bark.
10. The heat of the sun assisted by raindrops acting as lenses causing the scalding of the sap and bursting of the cells.
11. Fermentation of the sap.
12. The absence of certain mineral matters in the soil.
13. An epidemic transmitted from place to place by the air.
14. Fungi.

Each of the above theories was sustained by various writers, and it may be of interest to note that Henry Ward Beecher was an advocate of the theory that the cause of blight was due to the autumn freezing of unripe wood.

A. J. Downing, the distinguished author of "Fruits and Fruit Trees of America," applied the name "Frozen-sap blight" to the disease. His theory was that the disease was due to the freezing and thawing of sap. The sap thus lost its vitality, became dark and discolored and poisonous to the plant.

Thomas Meehan, editor of the "Gardeners' Monthly," supported the idea that fungi were the cause of the disease; but no tests were applied to prove that the inoculation of these fungi into healthy trees would cause the disease.

It was not until the year 1878, when W. T. Burrill, the Professor of Botany in the University of Illinois, announced to the State Horticultural Society the discovery of bacteria apparently connected with the disease. Burrill also proved that the disease was infectious and could be communicated to healthy limbs by inoculation, using the gummy exudation from an affected tree as a virus. Not only was he able to produce the disease in pears, but also in apples and quinces. Dr. J. C. Arthur, Botanist of the New York Experiment Station, subsequently confirmed Prof. Burrill's results and thoroughly established the fact that a certain species of micro-organism, named by the discoverer Bacterium amylovorum or the starch-destroying bacterium, was the sole cause of the disease.

Geographical Distribution.

This disease is peculiar to North America. So far it has never been recognized in Europe. Prof. Budd, of Iowa, who is familiar with the disease as it occurs in North America, has inspected the orchards of Europe, and states that no trace of fire blight of pear or apple trees can be seen in Europe. It is also known in New Zealand and Australia. In North America the blight extends from New York to California, and from the northern counties of Ontario to Texas. Dr. Beadle, in a sketch of the history of the disease in Ontario, states that, "In the early days of fruit-growing in the Niagara district we had no pear tree blight nor apple blight. With the advent of what people termed grafted fruit there came, after a few years, 'blight' on the pear tree . . . by the year 1840 it had spread considerably."

N. J. Clinton, of Essex County; S. Hunter, of Oxford; E. D. Smith, of Wentworth; Stone and Wellington, of Welland; R. Hamilton, Argenteuil, reported its presence in their respective counties about 35 years ago. The colder parts of the Province have suffered as severely from the disease as the more favored districts. The orchard of the Dominion Experimental Farm at Ottawa has been attacked, and the 140 Russian varieties of apples cultivated there have suffered severely. In warmer districts, however, the disease has been much more severe. Whole orchards have been completely destroyed in the State of Texas, and certain pear-growing districts in that State have been practically ruined by this parasite.

Losses.

No statistics are available to give us an idea as to the amount of loss to fruit growers from pear blight, but a few references to losses by this destructive disease will help to give us an appreciation of the subject. Coxe in 1817 reported that he had lost upwards of fifty trees in twenty years. In the years 1826, 1832 and 1844 there was an increased prevalence of the disease and few pear orchards escaped without partial or total loss of many trees, and some orchards were quite destroyed. Downing called it the "monstrous malady of the pear." Lyons stated, as the opinion of many cultivators in the State of Michigan, that "The pear tree cannot be grown with financial success on account of the blight." Hallam in 1882 reported that, "In Southern Illinois pears have failed—utterly failed, so that none are now cultivated for market. The blight has destroyed the trees, branch and root." While A. Noice, of the same State, doubted "if one-tenth of the pear trees that are planted lived ten years on account of this destructive agent." E. H. S. Dart stated that the severities of winter were not so much to be dreaded as the ravages of blight. He had in 1874 one to two thousand trees affected. Dr. P. A. Jewell in 1876 lost 10,000 Tetofsky apple trees by it. Bailey, of Cornell, declared that fire blight was undoubtedly the most serious disease with which the quince grower has to contend. It was the same disease which was so destructive to pear orchards in certain years and to certain varieties of apples, particularly the crabs. Selby, of Ohio, reported that the disease ranked among the most destructive known to the orchardist in his State. Chester, of Delaware, announced that pear blight was of unusual severity during the season of 1901 and caused much alarm because of its rapid spread through the orchards of the State. In 1895 its ravages were most severe on apple trees in the vicinity of Hamilton and Burlington Bay. J. Craig gathered information as to the character of injury of the disease from fruit growers throughout this Province, and a number of these stated that the injury was very severe.

These citations are enough to show that the disease is of special economic importance and greatly dreaded by many fruit growers.

SYMPTOMS.

The first indication of fire blight is seen either in the browning and subsequent blackening of the leaves or of the young twigs or of young tender shoots. When the twigs or shoots are the principal parts affected, the disease is spoken of as twig blight. Pears show the presence of the disease more frequently by the blighting and blackening of the leafy tufts of the spurs, and show it especially by the darkening of the blossom clusters on the larger branches; while later the branches themselves become blackened. The progress of the disease is always downward; an inch or more each day, depending upon the season, until the larger limbs are infected. In the more susceptible varieties it spreads more quickly, involving the whole tree; but in the more resistant varieties the progress of the disease is not so fast. When the disease is active the bark of the diseased branches cracks, and a thick, blackish, gummy fluid exudes, and later the affected bark becomes hardened, dry and shrunken. The disease occasionally appears on the larger branches and trunks of fruit trees, when these have been bruised or otherwise injured, when its appearance is similar to the injury known as "sun-burn" or "sun-scald." This disease of the trunks or larger branches is sometimes spoken of as "body blight" or "rough bark." The inner bark and cambium layer of the limbs and trunks are the most important parts of the tree killed by the blight. Instances are known of its

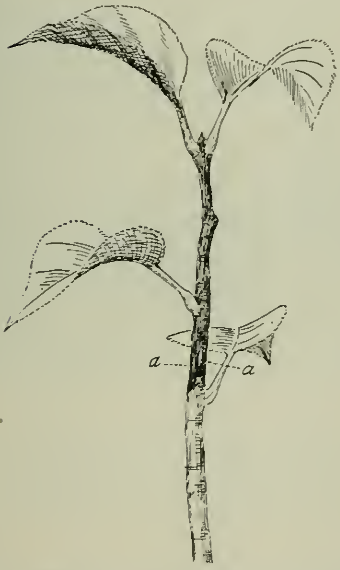


Fig. 1.—Showing the result of inoculating a terminal shoot with a pure culture of the Fire Blight organism by puncture at the point A.

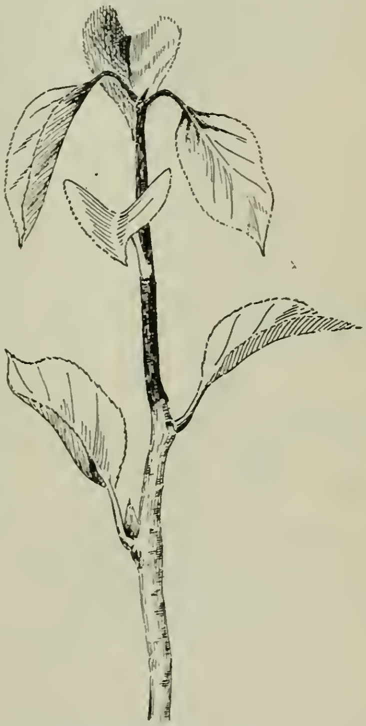


Fig. 2.—Showing the blighting of a terminal shoot by inoculation of the terminal bud with a pure culture of the Fire Blight organism. (After Chester).

attacking the fruit, producing watery ulcers accompanied by brown discoloration and decay. The disease may be known by its peculiar odor, said by some writers to resemble putrefaction.

When the disease is in progress, the discolored blighted portion blends gradually into the color of the normal bark; but when the disease has stopped there is a sharp line of demarcation between the diseased and healthy portions. (Waite.)

Microscopic Appearance of the Diseased Tissues.

The most conspicuous change in the tissues affected with the blight, is the disappearance of the stored starch, and on account of this peculiarity the organism has been named the "starch destroying bacterium" (Bacterium amylovorum). The germ penetrates from one cell to another and produces a gummy or mucilaginous matter which is found on the exterior of the affected parts. The microbe is found, as a rule only on the inner bark and in the actively growing tissues (called the cambium, which produces wood on the inner side and bark on the outer side). The organism is unable to grow in tissues that are lignified or woody.

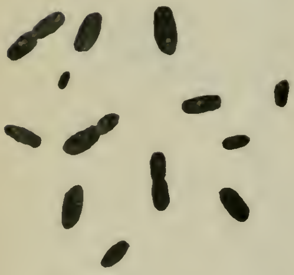


Fig. 3.—Fire Blight bacteria (B. amylovorum). x2000.

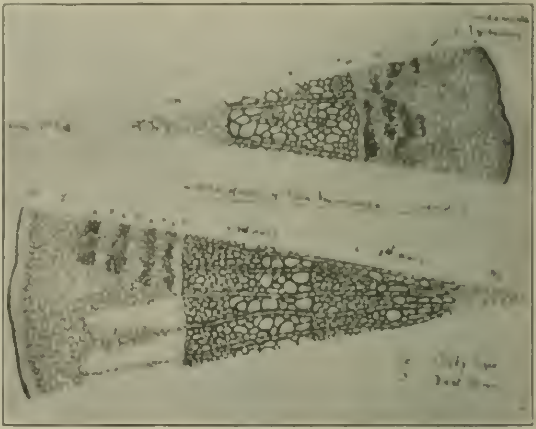


Fig. 4.—Cross section of a one and two year old stem. Fire blight bacteria grow in the cambium (c) and inner bark (F). E—epidermis. Co—Corky layer. B—Bast fibres. P—Parenchyma. C—Cambium. X—Xylem or woody tissue. M—Medulla or pith.

Life History of the Pear Blight Germ.

The organism which produces the disease is a small motile bacillus which increases with great rapidity in the succulent parts of affected trees. The microbe is of microscopic size, so small that 25,000 placed end to end would only measure an inch. They are able to live and multiply in the nectar of the blossoms from whence they are carried to other flowers by bees and insects which visit the blossoms for honey and pollen. From this locality the germs extend into the tissues, and then downward into the branches by way of the inner bark, girdling the limbs and causing a large amount of damage. The blight germ also gains entrance to the plant through the tips of growing shoots, thus producing twig blight. The organism is not killed by the winter frosts but lives in the bark in a dormant condition until spring. As soon as the plant tissues become gorged with sap in the spring the microbes, which have remained alive all through the winter, start to grow and extend into the new bark. This new blight which develops in the spring can be recognized by its moist and fresh appearance from the blighted, dead and dried bark of the previous summer. A large amount of gum is exuded from the affected bark and runs down the tree and attracts to it bees and other insects which carry the microbes to the early blossoms, and from these first flowers it is carried to others, and thus the disease extends.

The germ has never been discovered in the soil, although careful search has been made. hence the importance of recognizing the winter form of the disease. for if these affected portions of the tree are cut out and destroyed, the pear blight question is solved, for without the microbes there can be no disease.

Conditions Affecting the Spread of the Disease.

Fire blight differs in severity in different localities, and there are a number of conditions which affect the character and progress of the disease.

Every tree of the pome family is subject to the blight, but pears and quinces are more susceptible than plums and apples. The mountain ash, service berry and hawthorn are frequently diseased, but not to such an extent as the first named trees. There is a difference in the susceptibility of varieties. Thus among pears, Clapp's Favorite, Flemish Beauty, and Bartlett, are more liable to the disease than Keiffer and Duchess, and amongst apples, the crab varieties are the least resistant.

Climatic conditions influence the disease, warm, moist weather with much rain favor it. whilst bright, dry, sunny weather tends to check it.

High cultivation, rich soil, heavy manuring, free use of fertilizers, heavy pruning, or any other treatment which has a tendency to induce new and succulent growth, favors the disease, as the bacteria grow with greater rapidity and penetrate more quickly from cell to cell when the tissues are gorged with sap. Insects are more partial to young succulent shoots and leaves, and the bites and punctures of such insects whose mouth parts may be contaminated with pear blight germs often serve to infect the tree.

It is thus manifest that healthy, thrifty, vigorous, well-fed and well-cultivated trees are more liable to the disease than others, and hence the severity of an attack of fire blight may be lessened by conditions which are under the control of the grower.

Treatment.

The treatment of fire blight is of two kinds—that which is designed to put the tree in a condition to withstand the attack of the blight microbe, and those methods which aim at the extermination of the causal bacterium. Unfortunately all methods which are used for hindering the attack of the microbe consist of restraining the full development of the tree, and hence any such system of procedure should not be followed, unless an orchard is very badly attacked.

High cultivation, winter pruning and the other conditions already mentioned, as predisposing trees to blight should be avoided, but the trees should be allowed to ripen the wood, and in order to do this the fruit grower must use any method which will check the amount of moisture in the soil, for instance, by the growth of a clover crop.

The fire blight organism cannot be exterminated by spraying, as the microbe lives in the tissues beneath the outer bark, and it is impossible to reach it with any spraying solution, for unless the bacteria come into contact with the germicide, spraying is ineffectual.

There is, therefore, but one remedy. to cut out and burn the affected parts of the tree. It is very necessary when cutting out a diseased branch or twig to cut well below the discolored portion, as the bacteria are in most cases far below the discolored portion, the discoloration not being produced immediately upon the appearance of a few bacteria, so that if only the discolored portion were cut off, numbers of bacteria would still be left in the stump, and these would continue to multiply, and the disease would soon be evident again.

Cutting of affected parts may be done at any time in the winter and spring, but it is not advisable to cut in the growing season, as fresh cases may be constantly occurring, and these, owing to lack of sufficient development, would not be seen.

The best time for cutting out affected branches is towards the fall, or when the trees have stopped forming new wood, when most of the blight has developed, and when the contrast between the discolored leaves and branches and healthy tissus is easily seen.

Trees should be carefully inspected for blight during the winter, and in spring before the blossoms come out, in order to destroy any affected parts that have been missed at previous inspection.

All wild trees of the pome family in the vicinity should be examined as well, as these, if blighted, may serve to reinfect an orchard which has been carefully treated.

In cases where the bark of the trunk is affected, it can be cut out and the wound covered with a lead and oil paint. The cut surface of branches over one-half inch in diameter should be painted.

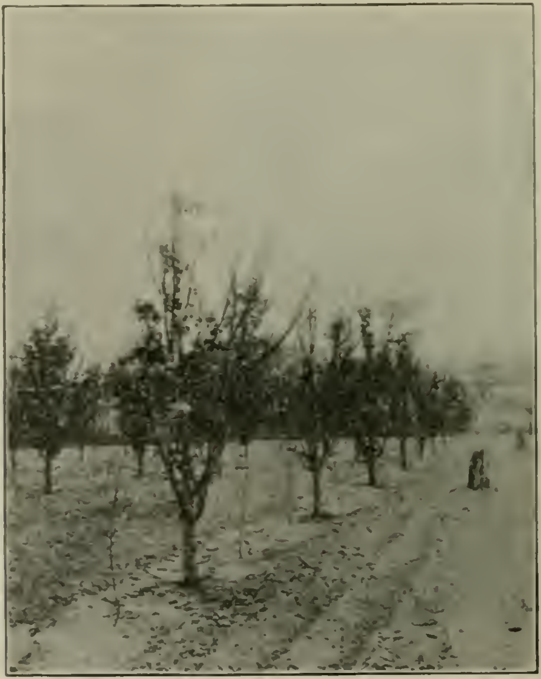


Fig. 5.—A pear orchard badly infected with Fire Blight.

NEW FRUITS

By Prof. H. L. Hutt, Guelph.

Your Committee on New Fruits, which is composed of Mr. W. T. Macoun, Mr. L. Woolverton and myself, have to report upon the new and seedling fruits which appear from year to year. Most of these are sent in to the different members of the committee from all parts of the country. In the past I have always presented the report for the committee as a whole, but this year Prof. Macoun has had so many interesting seedlings to fruit with him at the Central Experimental Farm at Ottawa that I have requested him to present that part of the report himself. I have to report, therefore, upon the new fruits which have come before Mr. Woolverton and myself. Quite a large number of samples have been received and examined, but as a rule with chance seedlings it is only one in a thousand that is equal to, or shows any improvement upon its parents. This year more really promising seedlings were received than usual, and as we believe it is a mistake to encourage the introduction of new varieties unless they are really superior to those already in cultivation, we shall call attention only to some of the most promising.

SEEDLING APPLES.

1. From John Bertram, Dundas. Received Sept. 1st. Size medium to large, oblate (3x2¼), wide shallow basin, calyx open, cavity broad, shallow; stem medium; skin yellow and prettily covered with light red; flesh white, mealy, fair quality and a pretty red apple about season of Duchess.

2 From W. T. Waller, Napanee. Received Sept. 12th. A beautiful red apple, something like Wealthy or Western Beauty. A chance seedling which grew up beside a building. Has borne regularly for the past two or three years. Is now about six inches in diameter and about three bushels of fruit this year. This is certainly one of the most attractive apples we have seen in some time, but it so nearly resembles Wealthy in size, shape, appearance, quality, and season, that it is doubtful if it would be advisable to propagate it as a new variety, unless upon further trial it proves superior to Wealthy.

3. From George P. McNish, Lyn, Ont., shown at Toronto Exhibition and reported upon last year. A large conical white fall apple,with bright red blush, and dotted red on sunny side. Flesh white, crisp, juicy, with pleasant sub-acid flavor. Would make a pretty dessert apple for home use, but too white in the skin to be of value commercially. Might be valuable for the north.

4. From Prof. Campbell, Yoho Island, Lake Joseph. Received Sept. 19th. A small to medium-sized apple, roundish oblate, shallow basin and cavity, closed calyx and short stem. Beautiful dark red with white dots on a yellow skin. A good winter variety, hardy enough to stand the rigors of that climate, is just what the people of that northern section are in need of, and it is possible this seedling may be valuable for that purpose.

5. From E. E. Anderson, Wyoming, Lambton County. Received Sept. 25th. Medium sized, oblong conic, oblique, handsome bright red, something like a Brockville Beauty: flesh whitish, crisp, juicy, brisk sub-acid, good quality: a good apple, but would not take the place of Gravenstein, which is about the same season.

6. From G. G. White, Paris. Seedling Apple, ten or twelve years old, second crop this year. Tree vigorous and thrifty. Two bushels this year, two dozen last year. Medium to large, showy red apple, yellow flesh, coarse-grained, fair dessert quality and said to be an excellent cooker. Season, October and November. A very good apple, but not enough better than others of the same season to make it worthy of introduction.

SEEDLING PEACHES.

1. From W. K. Ireland, Owen Sound. Received Sept. 10th. This was a peach of medium size, and of a very rich golden color with bright red cheek. The flesh was rich yellow, juicy, of good quality and parted freely from the stone. If, in addition to its other good qualities, this peach possesses any extra hardiness in the tree, which we would naturally look for in a seedling grown so far north of the regular peach sections, it would certainly be well worth propagating. Seedling from a four-year-old seedling of unknown origin.

2. From Wm. Forester, Oakville. A very large, handsome, yellow-fleshed peach, shown at Toronto Exhibition, August 8-12; looked like a Wheatland.

3. From Miss Thompson, Queen street, Guelph. Received Sept. 18th. A good sized, yellow flesh, free stone, of handsome appearance and good quality. From a seven-year old seedling that has been bearing for several years.

4. From James Mitchell, Paisley Block. Received Sept. 3rd. Medium sized, golden yellow, nearly covered with red, handsome, suture indistinct, fruit rather oblong, stem set rather deep, flesh yellow, juicy, rather poor quality, free stone, ripe.

5. From Jos. Carter, Liverpool street. Received Sept. 3rd. Small, yellow, roundish, marked suture, stem set deep, not showy, flesh pale yellow, stringy, fair quality, free stone, nearly ripe.

6. From Thos. W. Todd, 1,273 Queen street west, Toronto. Received Sept. 25. Large, round, very distinct suture, greenish-yellow, sparsely covered with dull purplish red, not showy, free stone, yellow flesh, juicy, very red around the pit. Quality fair.

7. From Thos. W. Todd. Medium-sized, roundish, pointed, suture fairly distinct, deep at the point, rather deep cavity, color orange yellow, well covered with dark red, showy, tough skin, persistent cling stone, yellow flesh, juicy, but tough, only fair quality.

8. From M. E. Wilson, 40 Bismarck street, Toronto. Received Oct. 10th. A large oval, yellowish fleshed peach, dark red on sunny side, free stone of good quality; season, first week of October.

SEEDLING PLUMS

1. From Alex. Glass, shown at Toronto. Received Sept. 9th. A large showy plum, a seedling from Glass Seedling, but it so nearly resembled its parent that it would not be wise to introduce it as a distinct variety.

2. From Frank Kean, Orillia. Received Sept. 14th. A large, handsome, very dark purple plum, with heavy blue bloom, roundish, good quality, somewhat resembling "Shipper's Pride." It is a seedling of the Lombard, but is larger than that variety usually grows, is quite round in shape, and of a dark purple color. The quality was excellent and it is to be hoped this tree may be extra hardy, originating as it has on the northern limits for the culture of that class of plums.

3. Samples of a very large and showy Americana seedling were received from Mrs. Lindsay, of Guelph. This plum was of excellent quality, and would be well worthy of a place in the home garden, even where the European and Japan varieties succeed.

GOOSEBERRIES

There is a great difference between the American and European varieties of gooseberries in their susceptibility in this country to mildew. The American varieties are almost invariably free from it, while the European varieties very seldom escape it. I have at the College, however, a variety of unknown origin of the European type obtained a few years ago from Mr. Crosby of Highland Creek, Ont., which bears larger berries than any other variety in our collection, and has never yet shown signs of mildew. The berries are long, oval, dark red, and of good quality. The bush is vigorous and hardy, but of a sprawling habit of growth, and, although not as productive as Whitesmith, the berries are nearly half as large again.

A case of wax models was used to illustrate this report in which each variety mentioned was represented in wax, so life-like that it would be difficult to distinguish the natural from the artificial. These models were made by Mrs. Stanley Potter, who is employed at this work at the College.

REPORT OF NEW FRUITS.

By W. T. Macoun, Horticulturist, C. E. F., Ottawa.

There were about the same number of seedling fruits as usual sent in for examination this year, but, as in the past, only a very small proportion were as good as the named varieties already on the market. The following are the best of those tested:

1. From Lack Daniel, Lindsay, Ontario, Seedling Apple. Size large, form roundish; cavity shallow, open; stem short; stout; basin medium depth and width, almost smooth; calyx closed; color pale greenish-yellow, almost greenish-white, with a bright pink blush on sunny side; dots moderately numerous, grey and green; skin moderately thick, tender; flesh white, crisp, tender, juicy, core small; flavor mild sub-acid, pleasant; quality good; season evidently mid September to November. November 4th, 1903, still in condition. A promising variety resembling Princess Louise in appearance and quality, but earlier. Evidently a seedling of Fameuse. Still in condition, November 5th, 1903. Received from Thos. Beall, Lindsay, Ontario.

2. Sport from C. H. Snow, Cumming's Bridge, Ont. Size above medium to large; form oblate, conic; cavity deep, open; stem short, stout; basin medium depth and width, wrinkled; calyx closed; color greenish-yellow, almost covered with dark red; dots moderately numerous,, yellow, distinct; skin thick, moderately tough; flesh white, tinged with red, crisp, juicy, tender; core small; flavor sub-acid, pleasant; quality good to very good; season early to mid September. Thought to be a sport of St. Lawrence, which it resembles in shape, flesh, and somewhat in flavor. However, does not appear to be as highly flavored at St. Lawrence. Promising.

3. From Thos. Connolly, Lindsay, Ont. Seedling. Size larger; form oblate; cavity medium depth and width; stem short, stout; basin medium depth and width, smooth; calyx open; color pale greenish-yellow, with traces of pink on sunny side; dots moderately numerous, indistinct grey and green; skin thick, tough; flesh yellow, crisp, juicy; core medium; flavor sub-acid, sprightly, pleasant; quality good; season probably early to mid winter. A promising seedling, but may not find a place.

4. Rideau. (Wealthy, female, and Duchess, male.) Form roundish, angular; size medium to large; cavity deep, open; stem short, stout; basin deep, open; calyx open or partly open; color pale yellow, well washed and splashed with bright crimson, especially on the sunny side; dots numerous and small, indistinct; bloom none; skin moderately thick, tender; flesh yellowish, firm, coarse, juicy; core rather small; flavor sub-acid, sprightly, aromatic, not high; quality good; season late September. Resembles Duchess somewhat in outward appearance, but is longer. There is a suggestion of Wealthy in flavor and sprightliness. Is showing indications of watercore, though flesh is remarkably firm. A handsome apple and may be useful as coming between Duchess and Wealthy. A cross made by Dr. C. E. Saunders in 1894 and fruiting this year for the first time.

5. From C. A. Cass, L'Orignal, Ont. Seedling Apple. Form roundish, conical; angular; size about medium; cavity narrow, medium depth; stem short, moderately stout; basin narrow, shallow to medium; calyx open; color pale yellow, well washed and splashed with crimson; dots obscure; skin moderately thick, moderately tough; flesh white, tender, melting, juicy; core medium size, open; flavor mild sub-acid, good; quality good to very good; season probably January and February. Bore in 1902 for the first time; nearly a barrel taken off. Probably a seedling of Fameuse. Lacks sprightliness. Same season as McIntosh and Fameuse.

6. From L. L. Livingston, Frankville, Ont. Form oblate; size medium; cavity open; russeted, stem short, stout; basin deep, open; slightly wrinkled; calyx open; color greenish-yellow, splashed and washed with dull purplish red; dits few, grey, distinct; skin thick, moderately tough; flesh yellow, crisp, moderately juicy; core small; flavor sub acid, pleasant; quality good; season later winter. Still in good condition. Would be promising if a little larger. May 2nd, 1903.

A large number of comparatively new winter apples are now fruiting at the Central Experimental Farm, and some of these promise to be very useful in the north and superior to those already grown. Among these must be mentioned Windsor Chief, Milwaukee, North Western Greening, Dempsey's No. 80, La Victoire, all of which are good keepers. The Edgehill, probably a seedling of Fameuse, which originated in the eastern townships, is a very promising red apple almost equal to the McIntosh in quality and keeping longer than that variety.

It is always interesting to the members of the Ontario Fruit Growers' Association to know what progress is being made in originating varieties of fruit for Manitoba and the Northwest Territories. Already many of Dr. Saunders' hybrids have been brought before this Association. The following six varieties are among the best of these which fruited this year for the first time:

Jewel—P. baccata female x Yellow Transparent male.
Robin—P. baccata female x Simbirsk male.
Silvia— P. baccata female x Yellow Transparent male.
Magnus—P. prunifolia female x Simbirsk male.
Betty—P. baccata female x Pewaukee male.
Golden—P. prunifolia female x Golden Russet male.

Of these the Jewel and Robin are among the best in quality and Silvia is interesting for its earliness, ripening during the second week in August.

PEARS.

Only two seedlings of merit were received:

1. From R. B. Martin, Elmira, Ont. Fruit large, obovate, obtuse, pyriform; color yellow with an orange blush; skin thin, tender; flesh yellowish, tender, melting, buttery; core small, moderately sweet, not highly flavored; quality good. Tested September 28th, 1903. Not high enough flavored to be especially promising.

2. From W. J. Kerr, Renfrew, Ont. Fruit medium size, obovate, obtuse; color yellow, with a faint pink blush; stem medium length, stout; flesh yellowish, juicy, buttery; sweet, but not high flavored. Quality good, season evidently early September, tested September 4th, 1903. Promising, if hardier than Flemish Beauty. Originated in the County of Leeds, said to be a seedling of Bartlett. Tree 20 feet high.

PLUMS.

Few seedling plums were received this year. During the first part of August we had the pleasure of testing the Emerald plum, sent by E. D. Smith, Winona. This plum has already been described in the report on "New Fruits," but is sufficiently promising to be mentioned again.

1. Seedling No. 1 from Thos. Greenfield, Archville, near Ottawa. Fruit large, roundish oval; suture indistinct; apex rounded; color deep purplish red; dots numerous, small, yellow; skin thin, tough; flesh greenish yellow, juicy, sweet; stone large, oval, cling; sweet, good flavor. Quality good to very good. A Domestica seedling of the Bradshaw type. Tested September 25th, 1903. Promising for Eastern Ontario.

2. Seedling from H. E. Wright, Summerside, P.E.I. Fruit large, round, oval; cavity medium depth and width; suture distinct, slightly depressed; apex slightly depressed; color yellow, well covered with deep red; dots obscure; skin moderately thin; flesh yellow, juicy, sweet, rich flavor; stone medium, cling. Quality very good. Tested October 1st, 1903. Raised from stone of a California plum. Ripens a few days later than Moore's Arctic and earlier than Lombard. A handsome, promising plum.

We should again like to draw attention to the Montreal seedling Domestica plums as being hardier in fruit bud than most others, and hence promising to be of great value in northern sections.

PEACHES.

Only one seedling peach was received in good condition, but it was a fine one :

From W. K. Ireland, Owen Sound, Ont. Fruit large, roundish, suture distinct, depressed, deepest towards apex: color yellow, well washed with deep red; skin moderately thick, flesh yellow, juicy, sweet, rich, good flavor; quality very good; stone, medium, cling. Tested September 16th, 1903, in prime condition. A promising peach.

GRAPES.

Although no new grapes were sent in for examination this year, a number of the newer varieties fruited for the first time, among these being three of Munson's hybrids, the Manito, Yomago and Atobia.

Of these the Manito is the most promising for northern districts. The following description was made of it :

Manito. Vine a medium grower, productive. Clusters below medium size, cylindrical, sometimes slightly shouldered and moderately loose; fruit below medium size, globular, black, with a blue bloom, skin thin, moderately tender, somewhat acid; pulp very tender, melting, sweet, good flavor; quality good; as early as Champion; a decided acquisition. The Rural New Yorker, in reporting on this variety, says that it ripens just before Moore's Early.

RASPBERRIES

The Herbert again did well this year at the Central Experimental Farm, and, owing to its hardiness, productiveness, size and quality, it is considered the best red raspberry, at least for the amateur.

Nothing more to add regarding small fruits.

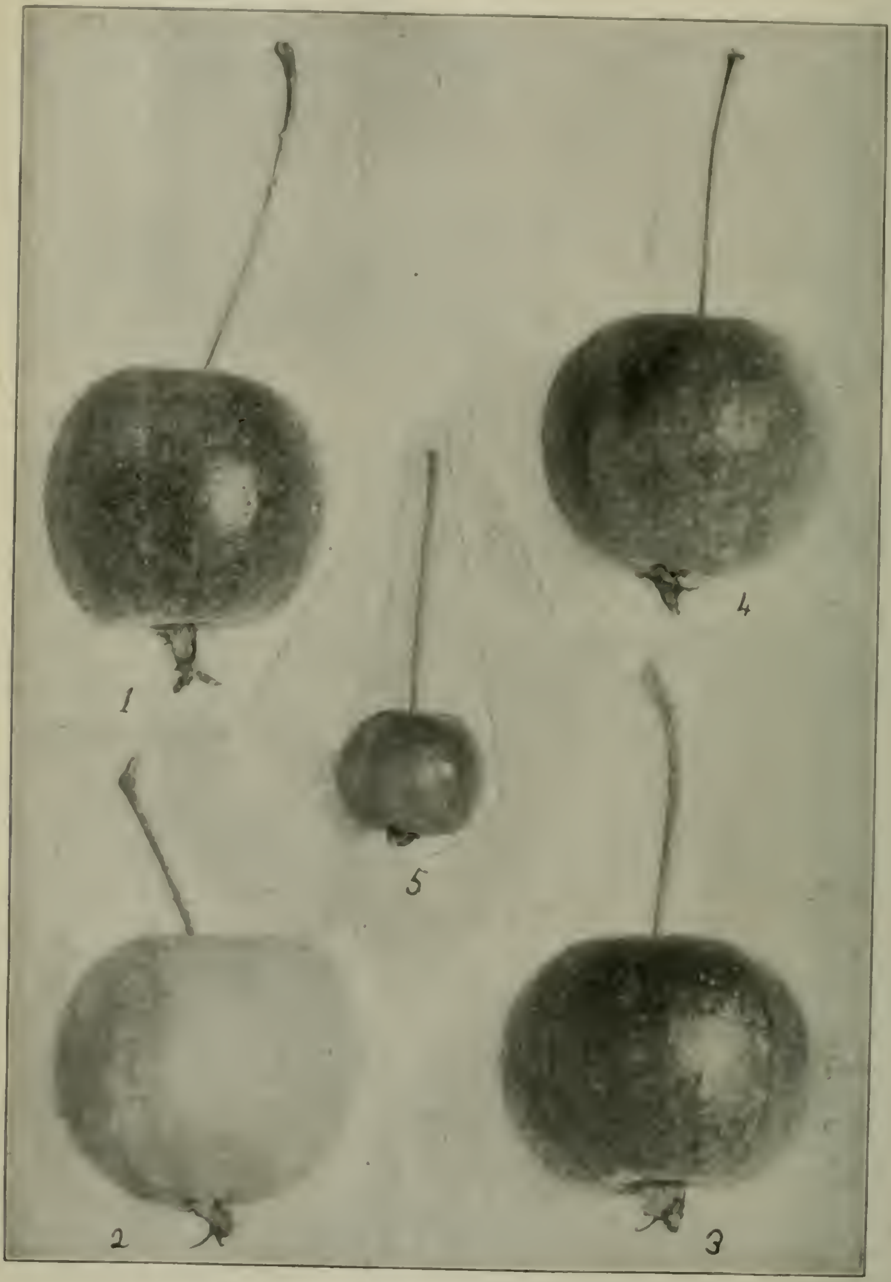
W. T. Macoun : It seems to me that this committee has two leading objects in view. One is to get as much information as we can about varieties of apples grown in other parts of the world that are not grown in Ontario, and to test them for use here and report on them. We are endeavoring to do something in that direction. The other main object is the examination of seedlings sent in from different parts of the country and reporting upon them. But after we report upon them and recommend them, it must prove a long time before they come into general cultivation. We should be very careful in extending our list of varieties; but what is the value of this committee, unless we are able to give the varieties that appear to have special merit a further trial ? What I would suggest is that in sections where such seedlings come from, and where they are considered to be of value for the district, the committee should have some way of having them tested in the climate where they originated, say at the local experiment stations.

Mr. Smith : While the work of the experiment stations is extremely useful, I agree that it could be made of even more use to the country if thorough and exhaustive experiments were made with the common kinds of peaches, plums and other fruits. In peaches, what we need principally in Canada is a peach that will ship a long distance. We have practically only one such peach coming in the heart of the peach season, the Elberta. Our markets are bound to be at long distances. The great market of the future will be the Northwest. We are, therefore, in particular need of a good shipping peach, even apart from the question of shipping to the old country. We want an Elberta peach a week earlier, and another a week later. There may be such peaches.

Prof. Hutt : We tried two years ago to do just as has been suggested—to get from the American nurserymen samples of the varieties they were introducing. I sent out circulars to these men asking them to send samples. In reply we received only one sample.

Mr. Morris : Would it not be well to have delegates appointed to the different fruit conventions on the other side ? A great deal of information could be obtained in that way as to new varieties.

Mr. McNeill: I wish to point to a few mistakes that have been made in our experimental work. I think there is a lack of careful discrimination in the varieties experimented with. We should not select varieties indiscriminately from the nurserymen's catalogues. We have loaded up our experimenters with useless varieties in this way, varieties that should not have been imposed upon them.



Showing Some of Dr. Saunders' Hybrids from Pyrus Baccata.

A GENERAL VIEW OF THE WORK OF THE ONTARIO FRUIT STATIONS.

By L. Woolverton, Grimsby, Secretary.

It was at the meeting of the Ontario Fruit Growers' Association at Peterboro', in December, 1893, that a committee, consisting of Messrs. John Craig, of Ottawa, Alex. McNeill, of Windsor, and W. W. Hilborn, of Leamington, was appointed to devise a practical scheme for experimental horticulture. The following are some extracts from the report of that committee as presented to the Hon. Minister of Agriculture in 1894:

"The exhibits of fruit made by Ontario at the World's Columbian Exposition gave to the world a truer conception of the possibilities and attainments of the Province. It also inspired the fruit growers of the Province with a better appreciation of the capabilities of her soil and climate for the production of fruit—that "flower of commodities"—in its highest state of excellence. It has also emphasized in a general way the fact that each variety of fruit varies in respect to appearance and quality according to the soil and locality in which it is produced, and has a more or less certain area in which it reaches most nearly perfect development.

"Our knowledge of the varieties in habit of growth and quality of the fruit, due to soil or climatic effects, is vague and undefined, and data with regard to the relative success of varieties in different sections is lacking. The fruit interests of the Province suffer in consequence.

"The Fruit Growers' Association has long recognized the advantage that would result from establishing a system of experiment stations, particularly designed to collect information of this character, and to promote the fruit interests of this Province generally.

"It is believed that the fruit interests of the Province cannot be served best by the establishment of a single experiment station, no matter where it might be located, and, further, that results more useful and more immediately available would be obtained by the establishment of a number of small and inexpensive trial experiment stations. These might be carried on in co-operation with the various fruit growers in different parts of the Province who already are specialists, and have made a financial success of growing one or more classes of fruit. For example, the services of a grape specialist, or a plum or peach grower, might be secured, with all the advantages accruing from knowledge gained by practical experience."

A grant of only $2,600 a year was asked for the prosecution of this work, which was this year, 1903, increased to $3,200, a very small sum in consideration of the work accomplished.

Our aim during these ten years has been to have all fruits, new and old, so tested in various parts of our Province that we could in time give reliable advice to intending planters regarding the kinds best suited to the various sections, and also as to the varieties most profitable for both home and foreign markets.

Hitherto the travelling tree agent has been almost the only authority, and his knowledge is usually limited by his gorgeously-colored fruit plates, which often grossly misrepresent the varieties. The tenderest varieties of apples have been sold to farmers along the northern shore of Georgian Bay, according to our experimenter in St. Joseph Island, while plums and cherries, and even peaches, have been sold in other northern districts, where nothing but disappointment and loss of money is sure to result.

Now we have fourteen stations, so disposed as to fairly well cover the Province, and each of these has been given several hundred varieties of fruit to be tested and reported upon. Your Secretary has about 800 varieties under test in the Niagara district, and has about five acres of ground occupied in his experimental plot; Mr. Hilborn, in Essex, about five acres, with about 250 varieties; Mr. Peart, at Burlington, 1 1-2 acres, and 214 varieties; Mr. Mitchell, in the Georgian Bay district, 5 acres and 200 varieties; Mr. Sherrington, in the Lake Huron district, 4 acres and [illegible]00 varieties; Mr. Jones, in the St. Lawrence district, 5 acres and about 200 varieties; Mr. Pettit, in Wentworth, about 3 acres and 200 varieties; Mr. Huggard, in Ontario County, 5 acres and 400 varieties; besides which we have our strawberry and gooseberry stations, and our stations for testing the most hardy fruits in Algoma and Wabigoon.

Just now we have under consideration the establishment of a station near New Liskeard to find out what fruits might be wisely planted by the many farmers who are taking up land in that promising district.

For some years the writer has been experimenting in another line, at his own risk, which may prove quite as important to the fruit industry of the Province as the testing of varieties. It is the export of the product to those distant markets where it is most in demand. So far we have not attained the success hoped for when the ocean cold storage for fruit was installed.

That peaches, Bartlett and Clapp's Favorite pears, Astrachan and Duchess apples would be most remunerative to us, if we could lay them down in perfect condition in London, Liverpool, Manchester, is proven by the exceptional prices received by the writer for stock which arrived in first-class condition. For example, on the 18th of September last, I had 162 cases (25 pounds each) of choice Bartlett pears sold in Glasgow at 8 shillings, or $1.92 each, or at the rate of about $14 a barrel! In that consignment were nine boxes of Boussock, and these sold for 7 shillings 3 pence, or about $1.75 a half-bushel box. On a former occasion I had some peaches carried over in a good condition, and they were sold at the rate of about $4 a bushel.

Now, these sales are sufficient to show the possibilities before us, could we only land our fruit in good condition. But alas! we cannot depend upon any given temperature being held for us on car or steamer from start to finish.

Surely here is a field for a great enterprise, if some steamship company could be induced to give us a temperature of, say, 33 degrees Fahrenheit for fruit for the whole voyage.

Another very important department of our work, the responsibility of which has fallen upon your humble servant, the Secretary of the Board of Control, is the description and illustration of the fruits of Ontario. The object of this work is to place in some concise and permanent form for easy reference, a technical description of each fruit, including all that is known of its history, absolute value and special adaptation. For this latter part of the work, the tests made at the various stations are essential, and, to carry out the scheme in full, there ought to be tested at each station all varieties of fruit that have absolute value, in order to know just where they may be successfully grown. Criticism upon this work is invited, in order that we may arrive as nearly as possible at a perfectly correct description of each fruit.

At the request of the Board, the Secretary has been asked to add to his work the testing of all varieties of cherries, because of the already large collection of that fruit at Maplehurst.

GRAPES.

By Murray Pettit, Winona.

Last year I discussed the newer varieties of grapes; this year I think it would be interesting to refer to some of the old standard varieties and what they have done with me. My first vineyard has been fruiting for thirty years. It was planted largely with Concord and Delaware. The Delawares average me two and a half tons to the acre, and net about $70 a ton. They require more labor or more expense in picking than some others, as we go over them twice a week from the time they commence to ripen. If you leave them till all are ripe, those that ripen earlier will burst. The price, too, is usually better as soon as they commence to ripen. There is a good profit in Delawares, planted on rich land and properly pruned. Do not attempt to grow them on the arm system or any system where you have to carry old wood. My plan is to renew from the ground. If you prune closely, they will throw out suckers from near the root. Then we spur prune a few of the suckers every year and get bearing wood for next season's fruit.

I also planted some Champions in that vineyard. The first that I shipped to Toronto twenty years ago sold at sixteen cents per pound. They have sold at paying prices ever since. But I would not recommend planting great quantities of the Champion. There is a great demand for a grape at the time the Champion ripens, and if we had as good a grape as the Concord to put on the market at that time, the market would take very great quantities.

In the spring of 1882 I planted 300 Niagaras, and in the fall of 1885 I sold from them $855 worth of grapes. That vineyard has borne regular crops ever since. In the spring of 1886 I planted 500 Niagaras. That vineyard has not had one pound of fertilizer since it was planted and has borne good regular crops. This year's pick amounted to 1,633 nine-pound baskets, for which I received over $300 for a little more than an acre.

The Lindley has also been a profitable grape, planted alternately with some strong fertilizing variety. In that way we get a better crop. The Agawam and the Catawba have also borne good regular crops, and have sold at good prices with me.

I referred last year to the packing, stating that too many mildewed, unripe grapes were put on the market, and also too many bruised and mouldy grapes. Both the growers and the railway companies are largely responsible for this. Many growers do not sulphur their vineyards. It is a very trifling expense when the grapes are small to go through the vineyards and throw sulphur into the vines. It should be done when the weather is still and a little moist. Walk down the row and throw the sulphur into the centre of the vine near the bottom wire. It is sufficient to throw in the sulphur from one side only and not from both. That will keep the vines free from mildew.

It does seem too bad that so many green grapes are put on the market and more care should be taken in this respect.

Very few growers have any idea of the condition their fruit is in when it reaches the consumer—picked by cheap help, thrown into the baskets, and then bumped and bruised on the railways. If they could see it after a few days of such treatment, they would not want to own it.

Q.: How much sulphur would you use on the vines ?

Mr. Pettit : About a tablespoonful to each. Where there has been a great deal of mildew, throw it in from both sides of the row.

Q.: What variety is most subject to mildew ?

Mr. Pettit : The Rogers.

Q.: What about the Brighton ?

Mr. Pettit : Yes ; it is subject to mildew, but we do not grow it much for market.

Q.: Have you fruited Campbell's Early ?

Mr. Pettit : It is the most promising new grape I have tested.

Q.: Does not the placing of so many Champions on the market early in the season affect the sale of the good blue varieties later on by prejudicing the consumer against grapes of that color ?

Mr. Pettit : Yes ; there is no doubt there is a point there ; but if a man can make good prices on Champions, there is a great temptation to do so.

Q.: Do you sift the sulphur ? I find that one bag that is sifted will go as far as two that is not.

Mr. Pettit : You are quite right.

Q.: What about rot ?

Mr. Pettit : I have not had much trouble with rot.

Q.: How do you treat black rot?

Mr. Pettit: I have not had much experience with it. Bordeaux Mixture is the proper remedy.

Q.: We suffer very seriously from black rot in this district.

Q.: What soil do you recommend?

Mr. Pettit: Grapes will thrive in almost any soil. I recommend a deep soil not too rich.

Q. What are the best of the Rogers varieties?

Mr. Pettit: Lindley is one of the best, but is not as productive as the Agawam.

Q. If you were planting a vineyard now, what varieties would you put in?

Mr. Pettit: I would plant some Campbell's Early, Worden, Lindley, Concord, Niagara and Agawam. Where grapes ripen very early, that is, on heavy, dry soil, there is some money in Champions, but if they are planted on a deep, moist soil, they are very sour. In localities where the Catawba ripens, I would plant it. Vergennes is another good grape, but no better than Rogers 15.

Q.: What proportion of Concords and Niagaras would you put in?

Mr. Pettit: Nearly two-thirds of these two varieties.

Q.: In equal quantities?

Mr. Pettit: Yes. The difficulty with the Niagara is that so many are sent to market but half ripe, which is due to the grower trying to get early prices. Another cause is that growers do not prune them close enough and allow the vines to bear too heavily, and the grapes are very poor in flavor.

Q.: In our locality grapes grown on clay are considered to make better wine, being sweeter.

Mr. Smith: We have not got a good grape in Canada; there is immense room for improvement. My suggestion is that the men who experiment with grapes or some of the experimenters should sow seed on an enormous scale and make a very exhaustive and thorough attempt to secure a really good grape.

Q.: What is the matter with Catawba?

Mr. Smith: It is too late.

Q.: The Concord?

Mr. Smith: It bruises, and is, therefore, a poor shipper. A quarter of the berries are cracked and get mouldy in the basket.

Professor Fletcher: With regard to black rot, Bordeaux Mixture is the best remedy. Mix 1 pound of copper sulphate with 24 gallons of water. Spray this on before the buds burst, and follow this with Bordeaux Mixture. Bordeaux Mixture may be cleaned from the grapes by dipping them in vinegar and water.

CURRANTS AND BLACKBERRIES.

By A. W. Peart, Burlington.

So far as currants are concerned, my experience is that the acreage devoted to this crop in this Province is about large enough for present requirements. I do not think I grow any fruit that pays me as poorly, and I grow all the fruits except strawberries. However, the question is as to the best varieties. I have found in my experience that there is no fruit that responds more quickly to good treatment than the currant. It will stand a good deal of neglect, but if we want large currants and productive bushes, we must take good care of them.

In planting currants, there is some variation in the size of the bushes, but the average distance apart is six feet each way, which will give 1,200 bushes to the acre. Do the planting deeply. Growers do not, as a rule, plant currants deeply enough; and this is true of other fruits as well. I aim to plant the trees a little deeper than they were in the nursery, as indicated by the sand line at the base of the trunk. I also believe in root pruning. When the bushes and trees come to us from the nursery, the ends of the roots are often bruised and torn. That portion of the root should be cut off with a clean under oblique cut, so that it will impact closely with the soil. I have pulled up trees two or three months after planting and found that the ends of the roots, where cut, had thrown out a soft granular formation, through which were protruding tiny rootlets. I make this a practice with all roots and trees except blackberries and raspberries.

In regard to cultivating: I plow my currants in the fall, and cultivate in the spring. I do not cultivate after the middle of July, as it is apt to promote late fall growth, and to make the plant tender.

In regard to pruning red currants, these bear the bulk of the fruit on spurs two years old and upwards. My practice is to thin out the old wood, leaving six or eight main branches, and cutting back the more vigorous shoots. I do not cut back to a single stem or trunk, tree fashion, for if I did, in our district I should probably lose many of the bushes from the currant borer. If, on the other hand, I prune so as to develop a bush growth, if one branch is attacked, I still have a currant bush left.

In regard to varieties: I do not think I have experimented long enough to be positive or definite on this subject. There are four or five varieties which I like very much. Of these, among red currants, I would still plant the Cherry. It is as good a currant and as profitable commercially as any I grow. I would plant a few Fay's Prolific, but it is not as productive with me as the Cherry. I am a great believer in the Wilder, which is one of the new varieties. It is as large as the Cherry—three-eighths to half an inch in diameter—hangs well on the bushes, is very productive, and of fine quality. It is slightly later than the Cherry.

Another variety that is promising well is the Pomona. I think it has the highest quality of any red currant I have. It is fairly productive, is a vigorous grower, and is promising well.

Q.: What would you consider the best commercial red currant in your experience?

Mr. Peart: If I were planting, I would plant largely of Cherry and Wilder, and also some of the Old Red Victoria. I would not plant white currants for commercial purposes as they do not bring the price.

Mr. Macoun: We have 110 varieties on test at the Experimental Farm, and I would recommend the three that Mr. Peart has mentioned, but I place the Wilder first

Mr. Peart: Black currants bear chiefly on wood of the previous year's growth. My method of pruning is to prune in the spring. Thin out the old wood and do not cut back the young wood to any extent. The tendency is not to prune out enough wood and the consequence is that a great deal of the fruit is small.

Q: Will you name the best varieties of black currants?

Mr. Peart: The Naples, Saunders, Collins' Prolific.

Mr. Macoun: Would an early black currant be profitable? Would there be any place for it?

Mr. Peart: I do not see any object in it. I think that as the season advances I get a better price for black currants.

Q.: Why do you reject Lee's Prolific?

Mr. Peart: It is not so productive with me; it seems to require especial care.

In the Burlington district. blackberries do best on a sandy or gravelly loam with a quicksand bottom. I make the rows seven feet apart. and the plants from two to three feet apart in the row. In regard to pruning, I go through them about the first week in July and cut back the young suckers from two and a half feet to three and a half feet from the ground. I do this to make the plants more vigorous and stocky so as to resist high winds. I then prune again in march. cutting off the laterals, leaving a foot to two feet, according to the variety.

Q. Can you give us the length of laterals according to variety, roughly ?

Mr. Peart : With the Taylor, the Kittatinny and the Agawam, the laterals should be left long. The Snyder, Western Triumph, and Lovett should be pruned shorter. The blackberry that is grown most extensively in my district, and makes the most money, is the Snyder. It is a moderately vigorous grower and thoroughly hardy.

Q.: Have you tried the Eldorado ?

Mr. Peart : Yes ; it is a light cropper, of good quality.

Mr. Sherrington : It is a heavy cropper with me.

Mr. Peart : If I were setting out a plantation, I would plant the Snider, Agawam, some Western Triumph, and some Kittatinny.

Q. What about the Gainor ?

Mr. Peart : Very promising ; the only reason I have left it out is, that I have tried it only four or five years. It is productive and an exceptionally large berry. The Ohmer is promising well, is large, hardy, productive and of good quality.

Q : What about the Ancient Briton ?

Mr. Peart : It has shown signs of tenderness, is only of medium size and relatively unproductive.

APPLES AND CHERRIES.

By G. C. Caston, Craighurst.

I think there is a possibility that some varieties of apples are gradually adapting themselves to climatic conditions, as I observe that varieties which were tender twenty years ago in our district seem perfectly hardy to-day. There are too many varieties in this country from a commercial standpoint, and we should be very careful about recommending new ones unless they have particular merit. Even though they may promise well to start with, sometimes a tree will flourish well for a number of years and then begin to fail. This is particularly the case with the plum. On the other hand, sometimes, the older the tree, the better fruit it will bear.

If you asked me what I considered the best commercial apple in Canada, I would say the Northern Spy. It is the apple that is wanted in our own local market and also in the northern States of the Union. It has the quality to recommend it, either for cooking or dessert. In the Northwest and in New Ontario the men who deal in apples all want the Spy. One of the principal objections to it is that it takes so long before bearing—anywhere from 13 to 17 years before it comes into full bearing. It is also inclined to rot in the trunk. The wet gets into the crotches and the tree falls apart. This is remedied by top-grafting, but the principal point in top grafting is that we get the fruit much earlier.

Q : How far up the tree would you top graft ?

Mr. Caston : In the limbs. As soon as the tree is large enough for cleft grafting, you can begin to top graft. The new top should not be worked on all at once, but by degrees.

In late winter apples, Cooper's Market is said to keep even longer than the Ben Davis. I do not know how it is as a bearer, as I have not had long enough experience with it yet, but I think it is a very promising variety. It is of better quality than the Ben Davis. Another variety that will keep as well as the Ben Davis is the Salome. It grows to a fair size, is a nice cooker, an excellent keeper, and of fair quality.

The Gano resembles the Ben Davis, but it is decidedly superior to it. It is just as long a keeper, a better cooker. I planted two trees in 1895 which yielded two barrels each of first-class apples this year. If apples of the Ben Davis type are to continue to be good market apples, I would recommend the Gano in preference to the Ben Davis.

Mr. McNeill: In the Cobourg district they were planted quite extensively, and they would just as soon have the Ben Davis.

Mr. Caston: The Windsor Chief is an excellent apple for sections where they cannot grow the Northern Spy. Possibly it will fill the bill as a good winter apple. It seems to be clean and hardy, and very promising. The Mann is also a very good apple, but it is inclined to be tender, and would be better for top grafting. It will keep till May.

The Ontario is a cross between the Northern Spy and the Wagener, and has some of the characteristics of both. With us it is one of the most promising apples. The tree partakes a little of the nature of the Wagener, being rather scraggy in the trunk. I think it would be better top grafted. It is an early and abundant bearer; is clean, free from scab, and while it does not come up to either of its parents in quality, it is an excellent apple and a good cooker, and will keep till May.

Mr. Thos. Beall: It is a far better cooking apple than the Spy.

Mr. Caston: In my opinion there is nothing better for cooking than the Spy.

Mr. Smith: If you were planting a permanent orchard, is there anything better to plant as a filler.

Mr. Caston: I do not know of anything better.

Mr. McNeill: Apple packers have not spoken highly of the Ontario. They say it is not a variety that they can ship with confidence during the later winter months.

Mr. Caston: With us it is an excellent keeper, but, of course, we do not store apples.

Mr. McNeill: Then you are scarcely in a position to judge?

Mr. Caston: Of course, the packers look for the Ben Davis and Coopers.

Mr. Beall: That apple will keep first-class till the middle of June.

Mr. Caston: That is our experience in a small way, and we can get nothing better for the Northwest trade.

Where you cannot grow the Rhode Island Greening, the Northwest Greening will take its place in the northern home market. It is a fairly good dessert apple, and a good keeper. The Stark does not begin to bear early, like the Ontario, which will pay for itself before the Stark begins. I am favorably impressed with that apple in our section, and think it will succeed over the greater part of the Province. It is a fine, healthy growing tree, and is one of the commercial sorts that can fairly be recommended. It is not of very high quality, and is not very well colored, but is a fairly good apple.

Possibly there is no old well-known variety in the country whose seedlings grow to resemble itself as much as the Snow. The Shiawassee Beauty is a seedling of the Snow. It has the advantage of being clean, which makes it a great exception to most of the Fameuse varieties.

In fall apples, the Peerless is early bearing, but I do not know whether it is prolific. It is a slow-growing tree, but very hardy. The fruit is always clean, and of a very handsome color. I think it should capture the old country market at that particular time of year, and that it is worthy of trial.

Cherries. The nearer you are to large bodies of water, the better will cherries succeed. In Russian varieties, the best I have experimented with is Oral No. 24. The fruit is very dark, and of better quality than the Ostheim. Oral 25 is said to be still hardier in the bud.

APPLES.

By Harold Jones, Maitland.

Many of the varieties referred to by the last two speakers I have at my station. Among the most promising of those mentioned with me is the Northwest Greening. It grows a little larger with me than with Mr. Caston. The tree I have was planted in 1897, and this year yielded about 2 1-2 bushels of fruit. The most promising of all the new varieties we have so far is the Milwaukee. It is a seedling of the Duchess, and originated in Wisconsin, and the character of the tree is very similar. It is a business tree right from the start; requires little pruning, bears young, and bears annually, and the only defect it has is that, being a heavy apple, it is a little inclined to drop in September, but is not nearly as bad in that respect as the Pewaukee. I have kept it until April in perfect condition. I consider it a good, all round apple, and with me it stands first among the new varieties.

Of the other varieties mentioned, the following have proved undesirable with me, namely: Salome, Winesap, Roman Stem, Sutton's Beauty, and the Mann, which sunscalds badly.

Q. What do you think of the Ontario?

Mr. Jones: It is subject to canker and frost injury to a large extent. It is going to be short-lived, and possibly I should have put it in the undesirable class. I have 160 or 170 trees. They are beginning young, and next year we shall have quite a crop on trees four years planted; but they are going to break off and be short-lived, and the orchard will be a wreck at the time it ought to be in full bearing.

I think the reports from experimenters would be more valuable to those living in the locality, and to the Province at large, if we were to give a list of the most profitable varieties for the district from the commercial point of view. In the St. Lawrence valley, for instance, the Fameuse group is undoubtedly the most profitable. We can grow these apples to greater perfection than in any other section of the Province, and we should recognize that. They will give us more money, tree for tree, for the fall market, that is, from September till the end of November, than any other variety, yielding as high as twelve barrels to the tree on 22-year-old trees, and they will sell for nearly as much money per barrel on the open market as the Spy. I have kept a close record of my orchard of Fameuse since 1894, just to find out what an orchard will give for a succession of years. Taking an average for eight years, it has netted me clear of the expense of the barrels, $200 per acre. I do not know of any other one variety put in a block of four acres, that will give such money on an average. One year it gave me $1,296. There are other apples of the same class doing equally as well with us, bearing heavily and annually, and selling equally well, namely, the McIntosh Red and Scarlet Pippin. The McIntosh Red is decidedly a box apple with us, and in that way will go to England in good condition. This fall we shipped them to Winnipeg in capital condition, and there has been a sharp demand for it. The Scarlet Pippin will stand the barrel trade better. It is inclined to over-bear as it gets age, and then the fruit is sometimes small. The McIntosh Red does not give as heavy crops with us as either the Snow or Scarlet Pippin. These are the leading early winter apples of our section. Wealthy is a desirable variety, but does not attain the same high colorings and size that it does in the Ottawa Valley.

For late winter apples we are not so well off. The best and most paying varieties we have for that season are the Golden Russet and Scott's Winter, which is of fair size, from two to two and a half inches. It has a sharp, acid flavor, bright color, keeps till May, and is in good demand all the time as a cooker. A cooker seems to have a more constant and general demand that a table apple. Closely following this is the Canada Red. It is rather inferior in quality, but keeps well. Before 20 years of age, however, the tree is decidedly unprofitable, but bears fair crops, when it gets age. It is bright red in color, thickly dotted.

The Seek is also a valuable apple with us, but is inclined to over-bear and run small, and has not the bright color of the others. The Winter St. Lawrence keeps well with us, and is a promising variety; so is the Canada Baldwin. We can grow Northern Spies, Baldwins, Kings, and apples of that class top grafted, but we cannot grow them so well as the Snow and the McIntosh.

RASPBERRIES.

By A. E. Sherrington, Walkerton.

The earliest raspberry we have for local use is the Reliance, but it is rather soft for shipping. It is a fairly vigorous grower and of very good quality. It is ripe by July 1st, and can be picked till August 1st. The Turner is similar, but a little firmer, and I do not know of any variety that will give better satisfaction for the table. The Loudon is an excellent berry, but is neither as firm nor as vigorous as it might be. It is very slow filling up in the row. I grow my raspberries under the hedge-row system, planting the rows six feet apart, and allowing them to grow up like a hedge. The Cuthbert is not tender with us, and is the queen of all raspberries. It is a rank grower, and the fruit is firm, and of good color, size and quality. It brings from one to two cents more than any other variety. The Phoenix is an excellent berry with us, but not as vigorous as the Cuthbert. It is very productive, more so than the Cuthbert, and the fruit is nearly as large, but not quite as firm.

In Blackcaps I can recommend Hilborn, Conrath, Older, and Smith's Giant. The Hilborn is perfectly hardy with us, and a good cropper. The Conrath is a little earlier. It is a very rank grower, and the fruit is large and of first-class quality. The Older is doing well, but the plants are of rather straggling growth, and have to be well pruned. The Smith's Giant has been doing well, but is a little tender. It is a very strong grower, and has a very large berry of good quality. It is a late variety.

In the light-colored varieties I have only one which has given any satisfaction, and that is the Golden Queen; but there is no market for these varieties with us. In purple varieties the Schaffer is too tender with us, and the Columbia slightly tender. We do not find this color profitable in the market. Schaffer is excellent for home use, especially for canning. There is a growing demand for blackcaps. A few years ago it was hard to find sale for them, but now I can hardly grow sufficient. They are an excellent berry for canning, and people are beginning to appreciate them. Personally, I think they are one of our richest fruits.

Q.: Do you mulch?

Mr. Sherrington: I have not done so for the last two or three years. Our practice used to be to draw straw to the patch and cover the ground just as the fruit commenced to ripen. This mulch held the moisture, and kept the fruit clean and free from sand. But it has this fault: it induces the roots to come too near the surface, and we have discontinued it on that account. We now draw in well-rotted barnyard manure, and scatter it over the surface in the fall, and cultivate in the spring.

Q.: Where do you classify the Craig?

A.: It is tender with us, and has not sufficient constitution.

CULTIVATION.

Raspberries are planted in rows six feet apart, and the rows about thirty inches wide, like a hedge; shallow cultivation is practiced, that is, they are kept clean by frequent and shallow cultivation. For fertilizing, well-rotted manure is spread over the entire ground in the fall; wood ashes is applied at the rate of forty or fifty bushels per acre every alternate year. The pruning is done by cutting out all the old and weak canes either in the fall or spring, and all fruiting canes of strong growing varieties have eight or ten inches of the late growth removed in the early spring. By this method we get a better quality of fruit. Blackcaps are planted in rows six feet apart and three feet in the row, and are cultivated the same as the red ones. The pruning of the blackcaps is done by pinching off two or three inches of the young canes when about twenty or twenty-four inches high. This causes them to throw out their laterals near the ground, making a strong plant. The laterals quent but shallow cultivation should be practised, so as to retain the moisture which are cut back in the following spring to about twenty to twenty-four inches. Fre- is necessary in the growing of raspberries.

STRAWBERRIES.

By E. B. Stevenson, Jordan.

I believe there is nothing more important in strawberry growing than a careful preparation of the soil, if you wish to be successful. There is no fruit that is more unsatisfactory and more unprofitable when neglected, and no fruit that will more readily respond to good care. None but those who know what the strawberry can produce under proper conditions can be made to believe what you can get off an acre of strawberries. I believe that the up-to-date grower,. who gives the strawberry all the favorable conditions, will clear one year with another from $225 to $275 per acre; in some years they will produce even more. Last year I gave some specific instances of this.

The best early variety in the neighborhood of Jordan is the Michael, but strange to say, it is not successful anywhere else that I know of. Other good early varieties are the Van Deman, Johnson's Early, and the Beder Wood. Next in rotation is the Clyde. In the early new varieties the Monitor has done well. It is a large bright, clean berry, a heavy cropper, and firm. Also the Palmer's Early.

Q: What is the season of the Monitor?

Mr. Stevenson: Early to medium; it is a mid-season berry. I should also mention the Haverland, and Tennessee Prolific. The Tennessee Prolific is one of the best market berries grown, and it is not as extensively grown as it deserves to be. It is a large berry. Next come the Saunders and the Williams. The latter is not as good as the Saunders. It is largely grown in the Jordan section, and shipped to Manitoba and the Northwest. They pick it too green in my opinion. The berries will color a little on the top while it is hard, and they are picked and shipped to Manitoba in that condition. It arrives firm, because it is not ripe.

Q.: I doubt if you could get them through if you allowed them to ripen.

Prof. Hutt: We have shipped ripe strawberries to Winnipeg all right.

Dr. McCullough, Blenheim: I picked some for the local market two days before they were ripe, and they arrived in prime condition.

Mr. Stevenson: That, I think, is the point; they must not be picked too green, or they will shrivel; they should be all colored but the small green tip.

Among the new varieties I would mention the Lyon as very promising, the Success and the Mrs. Fisher, which is one of the largest we have ever had, and seems most promising. Parson's Beauty is a good market berry among the older varieties; it is a good cropper, and very high in color.

Among the late varieties I would recommend the Gandy, Joe, and Aroma, and among the very late varieties, the Nettie, and the Timbrel No. 18.

Q.: What is the value of the Nick Ohmer?

Mr. Stevenson: It is very tender, and the blossoms and buds are killed by the frost.

Q.: Does the Clyde grow plenty of plant to cover the berries?

Mr. Stevenson; Yes, with cultivation. The Clyde is weakening now to what it was ten years ago.

Q.: Have you any strawberry that will yield as much as the Williams and give as fine a berry?

Mr. Stevenson: The Saunders.

Q.: Do you think the Clyde a good shipper?

Mr. Stevenson: No, I do not, for distant market. All right for near market.

Q.: What about the Irene?

A.: It is a very good late berry.

Q.: Miner's Prolific?

A.: It was dropped years ago.

Q.: The Semple?

A.: Very good, but it has an imperfect blossom. The berry is very fine, handsome and firm, and the variety is productive.

I want to announce to the Association that we have at last got the perfect strawberry. It is called the Cardinal. I have a letter from Mr. Streator, of Ohio, where it originated, in which he states as follows: "I shall be glad to send you plants of the Cardinal for testing. . . . . It has been examined by four expert judges of the American Pomological Society, and their expressed opinion is of such high character that no one need fear to send it for test. Until a few weeks ago it has not been sent from this place. . . . The Cardinal as a market strawberry far surpasses any variety I ever knew in all essential particulars; I have not found a weak point in it."

Mr. Crawford, who is called the Strawberry King of Ohio, saw the Cardinal growing on the grounds of Mr. Streator last June, and after he had returned home said he had lost interest in nearly all other varieties.

PEACHES.

By W. W. Hilborn, Leamington.

Among the great number of new varieties of peaches which I have tested very few are any improvement on the older ones. What has been said about apples is true of peaches; we have too many varieties, and among new sorts should select only those that show a decided improvement. However, in peaches, no kind will cover more than a few days, and therefore we should have good varieties extending over a period of nearly three months. At present we have not got enough good varieties to do this. Among the early sorts we have none that are good shippers, and there is great need of further experiments in that direction.

Among the newer varieties worthy of consideration is the Queenboro'. It is one of the earliest, but it is not an ideal market peach, yet it has a place to a certain extent. Next is the Triumph, which is the first yellow peach that ripens with us. When properly grown, it is a fine peach, and crops well, and the fruit is large, while the trees are young; but the fruit rots badly, and for that reason it is not a profitable market variety. The Brigden is a peach of the Crawford type, which has proved profitable. With us it is as good if not better than the Early Crawford; it is fully as large and perhaps a day or two earlier. It is a yellow peach and is said to be the same as the Garfield.

Q.: What about the Admiral Dewey?

Mr. Hilborn: It has not fruited sufficiently for me to offer an opinion. The New Prolific is proving profitable on sandy soils. The Engle Mammoth is one of the best market peaches we have. It is as large as the Crawford and is hardier and the fruit is a better shipper. I think it is more nearly an ideal shipper than any mid-season peach except the Elberta.

Q.: Are you giving these in the order in which they ripen?

Mr. Hilborn: Yes. Of those that have so far been well tested here, I consider the Engle Mammoth the most valuable of all the new varieties.

The Bronson is more of the Golden Drop type, but a little larger. It is a yellow peach of little color, but hardy and of good size. The Kalamazoo is another of the same type, but it is a few days later. The Banner is a local variety which promised well, but has been rather disappointing. It has been planted largely, and early in its history it produced some fine fruit, but last year and the year before, it was disappointing to many. This year the fruit was of good size and of fine quality, and I think will stand shipping equally with the Smock. It ripens in advance of the Smock, and has better color and better quality, and the trees bear young and very heavily. The Lawrence is the latest of anything we can ripen here. It is not quite large enough, but the fruit is of good color and quality and fair size.

Q.: Is it superior to the Salway?

Mr. Hilborn: It is freer from spots, and, if anything, of better form. It is about the same size as Salway; perhaps not quite as large.

Leaving out the early clingstones, the varieties I would recommend for early planting are as follows: Yellow St. John, Garfield, Early Crawford, Fitzgerald, Engle Mammoth, New Prolific, Elberta, Bronson, Kalamazoo, Late Crawford, Banner, Smock, Salway.

Q.: What about the Lemon Free?

Mr Hilborn: It has shown a tendency to drop its fruit.

Q.: Would you recommend planting any of the smaller varieties that have not much color?

Mr. Hilborn. Yes, for the reason that we want something to cover the entire season. Another reason is that these varieties are a little hardier in fruit bud, and will give fruit in years when some of the finer sorts will not, and we want fruit every year. Besides that, they are among the finest canning peaches we have.

Q: How do you class Steven's Rare Ripe?

Mr. Hilborn: It is one of the best shippers we have among the white varieties, and a fine peach when properly grown, but if not properly grown the fruit does not color properly.

Q.: Is the Champion a clingstone?

Mr Hilborn: Yes, the Champion we have here.

Mr. A. M. Smith: I got it from the originator in Ohio, and it is the finest white-fleshed peach we have. The genuine Champion is a freestone.

Preparing Lime, Salt and Sulphur Mixture.

I procured a small steam boiler (one made for steaming hog feed) and two coal oil barrels. Fill one barrel with water, turn in the steam, when hot put steam pipe in barrel No. 2, in which four or five pails of water has been placed, when this water has been heated to nearly the boiling point add 15 lbs. fresh lump stone lime, stir constantly while slaking. As soon as possible add 15 lbs. sulphur, rubbing it through a sieve and stir thoroughy. It is best at this time to add five or six pails of hot water from barrel No. 1; boil one hour, add 10 lbs. salt, boil 15 minutes longer, then strain into the spraying barrel and add sufficient hot water from barrel No. 1 to fill the barrel and apply as soon as possible, while hot. Never make up this preparation until ready to use it.

Q.: Do you slake your lime in hot water?

A.: Yes, and get the sulphur in as soon as possible, and then boil for one hour. I boil for an hour to make sure, and then add the salt and boil for fifteen minutes longer Three of us were able to prepare and apply five barrels per day.

Q.: Do you apply hot?

A. Yes; just as soon as possible, while hot.

Q.: Do you strain the lime?

A.: Yes: after it is boiled. I strain it through an ordinary sack.

Q.: Does the lint off the sack get into the pump?

A.: Yes sometimes.

Mr. Tweddle: Why not use a brass strainer?

Mr. Hilborn: Yes, but it seems to clog.

Mr Tweddle: If you do not allow it to dry it will not clog.

Q.: What is the idea of boiling the lime and sulphur for so long?

Mr. Hilborn: That is the direction, and I suppose it is to insure thorough boiling. As soon as you have one batch of material prepared and put into the pump barrel, you want to start in on the next batch It makes quite a difference how you put the sulphur into the mixture; do not dump it in in lumps, but stir in slowly, and it will dissolve more rapidly.

Q.: Did you ever try putting the sulphur in first and then adding the lime ?

A.: I never tried it.

Q.: Do you use flour of sulphur or rolled brimstone ?

A.: The ordinary flour of sulphur.

Q.: Do you notice any change taking place in the color of the mixture when the sulphur is dissolving ?

A.: Yes, the change takes place after boiling for about half an hour.

Dr. Jas. Mills : Mr. Fisher said that he tried all possible times, and that it seemed necessary to boil for the time stated.

Q.: In addition to checking the scale, does it do any other good ?

Mr. Hilborn : I think it does. I think that the general cleaning up it gives the trees pays amply for the work involved. In the block I sprayed for the scale there were a few Smock trees. The fruit on them was perfect, and colored up better and was finer in every respect than the fruit of other trees of the same variety elsewhere that did not receive the treatment. I also sprayed my cherry trees, and my opinion is that the aphis was checked very considerably by the use of this solution.

Q.: Is there any mixture that does not require boiling and which could be more easily prepared ?

A.: If I knew of one, I would use it.

Mr. Bunting : We have had a mixture on trial in our section which appears to give good results, but I would not discard lime and sulphur for it until we have had more experience with the new one. We are hoping that this solution may prove just as effective ; if so, it is very easily prepared and applied.

Q.: Will the lime and sulphur solution injure the leaves after they come out ?

Mr. Hilborn : Yes, and leaves that are touched with it are in many cases destroyed.

Q.: How would this spray affect the curl leaf ?

Mr. Hilborn : I think it is a valuable remedy for curl leaf, just as good as Bordeaux mixture ; in fact, as a general fungicide I think it is equal to the Bordeaux mixture. Of course, it cannot be applied after the foliage comes out.

EAST CENTRAL FRUIT STATION.

By R. L. Huggard, Whitby.

We have had a very favorable season for the development of our various fruits at this station, not only in wood growth, but the fruit crop as well. Out of some 88 varieties of pears that fruited with me I have found only about ten or twelve new varieties that equalled or excelled many of the older varieties.

Our system of cultivation for the last two seasons especially has been to have all the pruning done by the middle of April. We spray with Blue Stone about the last of March and then with full Bordeaux mixture, just as the buds are swelling (I think this is the most beneficial spraying of the season). Then we spray as soon as the blossoms fall and once or twice afterward, as we think is required. As our orchard is usually ridged up in the fall. we use the spring-tooth cultivator and disc harrow until about the middle of July, when further cultivation is prevented by the bending of the branches with fruit. We use ashes (which we buy) and barnyard manure, and the land gets its quota every two years. We invariably apply the manure in the winter as top dressing and work it into the soil, and I think this produces the best results both in wood and fruit. Pears do not require as much fertility as apples or plums.

Of varieties, the best early pears we have are Wilder and Lawson. next Clapps and Bartlett, and for fall and winter pears I would recommend Seckel, Angouleme, Duchess, Precoce, Clairgeau, Bosc, Compt De Paris, Dr Reider, Dr. Jules Guyot, Commice, Dorset, and President Drouard, not forgetting Keiffer, which has always brought me the most money per tree of any variety that I have.

We had no pear blight last season and very little the season previous. I have great faith in the efficiency of lye from hardwood ashes to prevent pear blight if applied early in the season.

PLANT PRUNING AND GRAFTING.

By A. E. Sherrington, Walkerton.

In planting an apple orchard, the first essential point to be considered is the location and the soil, for a great deal of the success of your orchard depends on these two points. Many people think that it is absolutely necessary that they should have a warm location, and this is just where they make a mistake, for a site that has a slope to the south or south-east is the very worst location possible, as the trees will sunscald, and the buds will swell early in the spring, only to be frozen later on. A site with land sloping to the west or north is preferable, as in that case you will have a cooler location, and the buds will remain dormant later in the season, and thus escape the late spring frost. High or rolling land is best, if such can be had, as high lands are always warmer, and permit of greater circulation of air and sunshine, which is essential to the growing of fruit. Low land should be avoided for orchard growing, for the reason that it is colder, and does not permit of the free passage of air around the trees. Of course, the farmer cannot always have all these conditions ; hence has to choose the best he has at his command ; but one necessity is that the land should be well drained, if not naturally, then artificially, for trees will not thrive if the roots are standing in water. The soil that I prefer is a clay loam mixed with limestone, as this makes a strong, warm soil. The land should be well manured before planting and worked deep.

A very common mistake when planting an orchard is to plant the trees too close. No standard apple tree should be planted nearer than forty feet each way. Bush trees or early bearing varieties of apples may be grown in between the rows, until such time as the standard trees will need the room, and then they should be removed. The farmer should decide, before planting, whether his orchard is to be a commercial orchard or one merely for family use, and should avoid the mistake, made by many of planting a great many varieties. Do not put in more than five or six at the most, and let these be of the good commercial kinds.

When the trees arrive from the nursery, prune off, with a sharp knife, all the broken or bruised roots, giving a sloping cut from the under side ; make a trench in the ground, placing the roots of the trees in it, and cover with clay and water until a mortar is formed, cover well, and leave them there for two or three days before planting. By this method they freshen up considerably, the moist clay adhering to the roots when they are removed to plant, causes the dry clay to cling closely to them, and makes the conditions favorable for an early growth.

In setting the trees dig the holes large and considerably deeper than is required for the trees ; fill up the holes with surface soil, so that the trees will stand about three inches deeper than when in the nursery ; place the roots straight and natural, and use the surface soil for filling in, packing it firmly around the roots Leave no vacant places for the air to get in and dry out the roots. Pack the soil firmly to within two inches of the surface, leaving the top mellow and loose, so as to retain the moisture.

The reason so many young trees have failed to grow is because all of the top has been left on, just as when grown in the nursery. It must be remembered that more than half of the roots are left in the ground when dug, so that the top should be thinned and cut back to correspond with the roots. This should be done immediately after planting. Leave three or four limbs to form the head of the tree, and thin out and cut back the rest just above the bud. It also must be remembered that the tree can take no nourishment from the soil until the new roots are formed, and if the whole top is allowed to remain it is too great a drain on the material stored up in the plant. This is one great reason why so many trees die the first or second year after planting.

The success of the orchard depends largely upon the care that it receives when young. It should be well cultivated and fertilized ; corn or roots should be grown in the orchard, but do not plant too close to the trees, and allow room for cultivation. Keep the young trees growing vigorously. Clover may be grown for one year, and then plowed under, and this will add nitrogen and humus to the soil. Cultivate intelligently, prune annually and spray faithfully, and you will be well repaid.

Now, to those who are contemplating planting an orchard, I would recommend the planting of such hardy varieties as the Talman Sweet, Pewaukee, and McMahon's White. the Talman preferred. Cut the head as directed above, and when grown two years, or the limbs have made a growth of three-quarters of an inch in diameter, top-graft them to the variety wanted. By this method you will know just what you have in your orchard, and this is not always the case when getting your trees from the nursery. Another advantage is that you will have a stronger and better tree, and one that will come into bearing earlier. This is especially the case with the Spy and King. We know that there is individuality in trees as well as in animals, so some attention should be paid to the trees from which the scions are taken, and be sure that they are taken from trees that give good annual crops of apples of fine quality. Under these circumstances you may expect that your orchard will be just like the orchard from which the scions are taken.

In grafting trees the limbs should be cut at from three to four inches from the forks of the tree, as this method insures a strong, vigorous stalk, with well knit forks. This is especially true of the Talman Sweet.

REPORT OF COMMITTEE ON FRUIT EXHIBIT AT LEAMINGTON.

Simcoe Station, G. C. Caston. 25 plates. McIntosh, N. W. Greening, King, Shiawassie, Ontario, Peerless, Stark, Salome, Shackleford, Spy, Pewaukee, Mann, Swaar, Cooper's Market, Winter Rose.

Lake Huron Station, A. E. Sherrington. 23 plates,. 15 varieties. 6 plates N. Spy, N. W. Greening, Shackleford, King, R. I. Greening, Wagener, Ontario, Mann, 2 Pewaukee, Wealthy, 2 G. Russet, 2 Salome, Ben Davis, Ribston, Seek.

F. E. Webster, Creemore, 8 plates. Fallawater, Wagener, King, Ben Davis, Cabashea, Cayuga, Snow, Greening.

Robt. Thompson, St. Catharines. 34 plates apples and 1 quince, 25 varieties. Talman, Cayuga, Cabashea, Seek, Mann, Jenetting, Golden Russet, Fameuse, Canada Red, Jellifleur, Blenheim, Haas, 3 Baldwin, Roxbury, Swayzie, Pomme Grise, Newtown, Ben Davis, Greening, Fall Pippin, Bellefleur, King, Salome, Duchess, Vandevere, Pomme Grise

W. H. Bunting, St. Catharines. Two cases Baldwins packed for market, 9x12x18, 9 1-2 x 11 x 21.

Albert Pay, St. Catharines. 2 plates Anjou, 2 plates Clairgeau, 1 plate Bosc.

L. B. Rice, Port Huron, Mich. Anjou, Keiffer, and plate of peaches.

Jos. Tweddle, Fruitland. Pyramid of N. Spys, fine quality and highly colored.

W. M. Orr, Fruitland. 4 plates Keiffer, 2 Lawrence, 4 plates grapes.

C. L. Stephens, Orillia. 14 varieties (for identification), 1 Gano, 2 Wagener,. 3 and 5 unknown, 4 and 6 Baxter.

South Essex Fruit Exhibit. By Leamington Horticultural Society. A large exhibit of about 25 varieties of apples. A specially fine lot of fruit; 2 large peaches in liquid, 15 plates pears, including Keiffer, Duchess, Clairgeau, Bosc, Anjou; 3 plates quinces.

Bay of Quinte Station, W. H. Dempsey. About 90 varieties. Among others being Spy, Ontario, King, Stark, Ben Davis, Winter Banana, Lawver.

W. L. Smith, Whitby. Pyramid of Kings, very highly colored.

Burlington Station, A. W. Peart. 18 varieties of apples, 7 varieties of peaches, 1 variety of quinces.

J. E. Hambly, Cedar springs, 25 varieties of apples, 3 varieties of pears, 1 variety quince

J. F. Brennan & Sons, Grimsby. 3 boxes of Spy, graded, wrapped and packed.

St. Lawrence Station, Harold Jones. 20 varieties apples. Snow, McIntosh and Scarlet Pippin, especially fine.

Wm Rickard,. M.P.P., West Durham. 10 plates apples, fine.

East Central Station, R. L. Huggard. 16 plates pears, 20 plates apples.

W. Harris, Day Mills, Algoma. 6 varieties apples from the north. McMahon, Pewaukee, Gideon, Fameuse, Wealthy.

Central Experimental Farm, Ottawa. 63 varieties apples, some of the promising being mentioned in printed list accompanying. Windsor Chief, Edge Hill, Scott's Winter, Dempsey No. 80, McIntosh.

Ontario Agricultural College, Guelph. Collection of wax fruits.

Ottawa Horticultural Society. 33 plates highly colored apples. McIntosh, Alexander, Wolfe River, Baxter; bottle of preserved Herbert raspberry.

A. D. Harkness, Irena. 16 plates of apples, McIntosh and Fameuse, fine.

LIST OF 63 VARIETIES OF APPLES, EXHIBITED AT LEAMINGTON, ONT., GROWN AT THE EXPERIMENTAL FARM, OTTAWA, WITH NOTES ON RELATIVE MERIT.

American Golden Russet (hardy, shy bearer).
Allen's Choice (new).
Baxter (hardy).
Bessil (not promising).
Bogdanoff (Russian).
Bell Pippin (not promising).
Cullender (seedling).
Clayton (promising).
Duke of Connaught.
Eisike (promising).
Furst Taffit.
Forest.
Gideon (not desirable).
Haas.
Jennie (not promising).
Lawver (great keeper).
Milwaukee (recommended).
Marmalade (Russian).
Malinda (hardy, not juicy).
North Western Greening (recommended).
Northern Spy (recommended, top grafted).
Pewaukee.
Patten's Greening (very hardy).
Russian. No. 17.
Salome (fruit irregular).
Sklianka (Russian).
Thompson No. 35 (sweet)
Wealthy (highly recommended)
Walbridge f. x. Northern Spy m. (promising).
Windsor Chief (hardy, recommended).
Walworth Pippin (does not mature).
Arthur (not promising).
Arabskoe (Russian).
Borsdorf.
Black Annette (promising).
Bethel (hardy, shy bearer).
Cellini (hardy, English variety).
Canada Baldwin (shy bearer).
Calumet (origin. north of Ottawa).
Dempsey No. 80 (promising).
Edgehill (promising).
Fameuse (recommended).
Fameuse Noire (not promising).
Huntsman (promising).
Hardy.
Kara Sinap (Russian).
Missouri Pippin (promising).
McMahon White (hardy, productive).
McIntosh (highly recommended).
Minkler (promising).
North Star.
Palmer (promising).
Plumb's Cider.
Rubicon.
Stone.
Seek (promising).
Scott's Winter (hardy, recommended).
Uncle Sam (probably Bethel).
Waterson No. 3.
Winter Rose (fairly promising).
Winesap (a top graft).
Winter St. Lawrence (not juicy enough).

Horticultural Societies.

At the regular meeting of the Association, held at Walkerton in 1902, a special series of meetings for members of Horticultural Societies was held, and addresses were delivered by prominent horticulturists on subjects of interest to all lovers of flowers. Such was the success of these sessions that at the last annual meeting, held in Leamington, a further enlargement of this idea was carried out. On the last day of the meeting two entire sessions were set aside, and a special building provided in which members of the Horticultural Societies in affiliation with the Ontario Fruit Growers' Association gathered to listen to some of the most prominent floriculturists of the Province. Cayuga Society sent their Secretary, Mr. A. K. Goodman, to deliver an address on the work of Horticultural Societies in towns and cities. Mitchell was represented by Mr. T. H. Race, President of the Mitchell Society, and Woodstock by Mr. Jas. Scarff. while Guelph sent Prof. Hutt, Miss Rose and others. Quite a number of other societies in the west were represented. This part of the programme was altogether one of the most interesting not only to the delegates, but to the members of the local Horticultural Society in Leamington.

A still further extension of this work will be carried out at the annual meeting in Toronto in November of this year. It is proposed to affiliate with the Toronto Horticultural Society in its annual chrysanthemum show, and to hold besides a large fruit exhibition. As the place of meeting is very central, and affords splendid hotel accommodation and railroad facilities, it is expected that every horticultural society in the Province will appoint a regular delegation to the meeting.

The following papers were among those read at the Leamington meeting. A number of special articles which have been published in the "Canadian Horticulturist" from time to time are also included in this report with the hope that they may be in better form for constant reference when sent out in this volume.

BEAUTIFYING HOME GROUNDS.

By Prof. H. L. Hutt, O.A.C., Guelph.

The sturdy pioneers who first settled this country came with a determination to subdue the forests and to hew out for themselves homes in the wilderness. Their first aim was to clear the land for the growing of crops, and this usually kept them so busy that they had little or no time for levelling of lawns or planting of shade trees and ornamental bushes. But we have now reached a period in the country's history when comfortable homes are thickly dotted throughout the land, and more attention is being given to the beautifying of the home surroundings. Not only is the skill of the landscape architect more and more in demand, but there is a call for information on the subject by those who have not the means to employ a professional gardener. In this paper we shall call attention to some of the leading principles which should guide in laying out and beautifying the surroundings of a country home.

In the first place it must be understood that the most beautiful scenes are, as a rule, more or less natural We should, therefore, accept nature as our teacher, and study the materials and combinations which go to make up natural beauties.

The materials with which the landscape gardener has to deal may be classified as natural and artificial. The natural materials are the ground, grass, trees, shrubs, vines, herbaceous plants and annuals, and in some cases rocks and bodies of water. The artificial materials are trees and shrubs clipped into unnatural shapes, geometrical beds of improved flowers, terraces, walks, drives, buildings, fountains, statuary, etc. The skill of the landscape gardener in producing beautiful effects depends upon the judicious use of these materials. We shall now treat of some of these in detail.

The Ground. One of the most important features in the ground surrounding a home is the contour of its surface. This is what gives character to a place. A low lying lawn, with something of a depression in the centre, has a somewhat tame appearance, while an otherwise similar lawn, with but a slight crowning in the centre, has an altogether different appearance. Sometimes a perfectly straight surface line is pleasing, and the level lawn is more in keeping with the place and its surroundings than any other could be, but as a rule some variation from the straight line is preferable. In nature we take more delight in bold outlines of hills and valleys than we do in level stretches of country. This is because we love the variety which hill and hollow affords, and this suggests the desirability of introducing undulations in landscape gardening whenever the size of the grounds and other circumstances will permit.

The buildings should, of course, be on the highest elevation, and the grounds should be made to slope away from them. On a steep hillside the grounds may have to be terraced, which, if well done, adds much to the appearance of a place, but likewise adds considerably to the cost. Whether the grounds are flat or rolling the small irregularities of the surface should be levelled and smoothed so that the mower may be worked easily. Wherever much grading or filling has to be done due allowance must be made for settling, and a few inches of good surface soil should always be left on top. The character of the surface soil is a matter of great importance, because on it depends the luxuriance or poverty of the grass and the trees growing over it.

The Green Sward. There are two ways of clothing the ground with grass, either by sodding or by sowing grass seed. On small plots or steep banks and along borders, sodding is the quickest and most satisfactory method, but on large areas seeding is not only the cheapest, but the best. In preparing the ground for seeding it should be plowed, harrowed, rolled and made as fine as possible, and as a final preparation nothing is better than going over it carefully with a garden rake.

The kind of seed to sow is a matter of importance. Coarse grasses, such as timothy, are not suitable for lawn making. Many of the finer and more delicate grasses may be obtained in "lawn grass mixtures," but the most satisfactory mixture we have found is made up of equal parts by weight of Kentucky blue grass, red top grass, and white Dutch clover. All of these are hardy and stand well the extremes of our climate. The seeding should be done on a still day when there is no wind to carry the lighter seeds. Thick seeding should be the rule. Three or four bushels per acre is none too much for seeding down a lawn. In fact, the grass should come up as thick as the hair on a dog's back. After the seed is sown it should be lightly raked in,. and if the weather is dry it is well to go over the ground with a hand roller. The work of making a lawn may be done at almost any time of the year, but where much levelling and filling is necessary it is well to do the grading in the fall, so that the ground will have finished settling by the spring, and then the surface may be raked over as soon as it is dry enough to work, and the seeds sown as early as possible. A lawn sown early in the spring should be nice and green by the middle of the summer, or seed sown early in the fall should give a good grassy carpet early next spring.

Keeping a Lawn. To keep a lawn in prime velvety condition it should be mowed frequently, particularly during the season of rapid growth. The mowings should be so frequent that none of the grass should have to be raked off. This is the practice followed on well-kept city lawns where men, money and mowers are available. On the farm, where these articles are not so plentiful, and where the area to be gone over is usually greater, it may be kept in very respectable conditions with the ordinary farm mower, the cutter bar of which should be set low and the knives kept sharp. On the farm the front yard and back yard, the lanes and the roadsides should be levelled, seeded and put in such condition that they can all be gone over with the farm mower, and if the mowing is done as often as the grass is high enough for the knives to cut nicely, the improvement made in the appearance of a place would in many cases add nearly 50 per cent. to the value of the property.

To maintain a luxuriant growth and a rich dark green in the color of the grass, the lawn should occasionally receive a top dressing of stable manure in the fall. The soluble portion of this is washed into the ground by the fall and spring rains, and early in the spring the coarsest portion of the manure should be raked off.

Trees and Shrubs. In the trees and shrubs we have some of the finest forms of natural beauty. They present a great variety of ornamental qualities, in habit of growth, in size, in color of bark and foliage, and in their flowers.

Taking the trees first, they may naturally be divided into two classes, the deciduous and the evergreen trees. If space permitted we could give a lengthy list and mention the special claim of each to a place on the lawn,. but we must be content with mentioning only a few of the most desirable. Among the maples we have the sugar maples, the soft maples, and Weir's cut-leaved variety of the same, the Sycamore maple, and the Box elder, sometimes called the Manitoba maple, which is particularly valuable on new places on account of its rapid growth, but along with it should be planted some of the more durable trees. which will come in and last long after the Box elder has served its purpose. As a successor to it we know of none better than our native American elm. In its finest form, with feathered trunk, high spreading arms and long, pendulous branches, this is, in our opinion, the most stately and graceful of our native trees. On large grounds, where there is room for variety, some of the rugged oaks and fragrant lindens add a charm to the scene. The cut-leaf weeping white birch is very ornamental in both summer and winter, and shows a striking color contrast,. particularly when placed so as to have for a background a group of evergreens or a dark-colored building.

Among the evergreens the pines and spruces occupy a first rank. The Austrian and Scotch pines make handsome specimens, although when young our native white pine is equal, if not superior to, any of the foreigners. The same might also be said of our native white spruce, as compared with its more vigorous relative from Norway. But for a handsome specimen of nature's coloring let us have the dainty little blue spruce of Colorado. Among the arbor vitaes, junipers and retinosperas there are some very beautiful forms, such as the pyramidal and globose arbor vitae, the tall Irish juniper, and the plumose retinospera, but those last mentioned are less hardy than the arbor vitaes and require protection for a few years in the colder sections of Ontario.

Ornamental Shrubs. For a list of some of the most desirable and hardy ornamental shrubs adapted to our northern section, I cannot do better than refer intending planters to the valuable list given in Mr Macoun's report in the Central Experimental Farm Report for 1897. One hundred species and varieties are there mentioned, with twenty-five of the most desirable marked. If we were compelled to reduce the list to half of that number, we would from our own experience select the following: The Caragana or Siberian pea tree. Hydranga paniculata, the Tartarian bush honeysuckle, the mock orange or Philadelphus, the golden currant, Spirea Van Houteii, the Weigelia, the purple fringe, the old-fashioned lilacs in variety, the snowball or Viburnum, and last but not least, roses in variety.

Arrangement of Trees and Shrubs. To artistically arrange and distribute a collection of trees and shrubs on the lawn requires much more skill and judgment than to set out trees in a straight line in an orchard. The following rules should be observed in lawn planting:

1. Follow the Natural Order of Arrangement. Nature does not plant in stiff and formal geometrical lines, but rather in irregular profusion, in too much profusion. It is

often necessary, therefore, to modify the natural arrangement to meet the needs of the case. One has said that "the aim should be to exhibit nature idealized rather than nature real. A prominent American landscape gardener tells us that for his first lesson in arranging trees on the lawn he was told to take in his hands as many stones as he had trees to plant, to stand by the house and throw them in the direction he wished the trees to stand, then plant wherever the stones fell. He says that with a few slight modifications the effect was all that could be desired.

2. Arrange to Give an Air of Breadth and Expanse to the Place. This is a most desirable effect, and is secured by preserving a more or less open lawn in front of the house, by scattering and grouping the larger trees at the outside of the grounds so as to more or less hide the boundaries. This suggests an unlimited extent, beyond what the eye can see at any point. Another means is by opening vistas between the trees, looking out upon distant scenes beyond the boundaries. In this way we may shut out undesirable objects, and we may appropriate to ourselves desirable scenes, such as a wooded hillside, a stretch of river, or a church spire, and thus make our little grounds seem like part of an extensive park.

3. Arrange for Trees to Give Comfort as Well as Ornament. One of the first considerations should be to shade the buildings from the heat of the sun and to shelter them from the sweep of the prevailing winds. On the south and west should be planted a few of the largest trees, such as elms or maples, not so close as to exclude the light from any of the windows, nor so that any of the branches, when the trees are full grown will overhang the house, but close enough that their shade will fall upon it. In all planting the effect should be watched from the principal windows, and we must take into consideration what the results will be when the trees are full grown.

As a protection against the sweeping winds of winter some of the strong growing evergreens, such as pines and spruces, are most useful. Thick belts or clumps of these should be planted on the most exposed quarters, and along with them may be planted a few of the light-colored deciduous trees. In winter the evergreens give a cosy appearance to the place, and in summer their sombre darkness is relieved by the bright green of the deciduous trees.

In arranging the smaller trees and flowering shrubs, these may be grouped into ornamental groups, or occasionally fine specimens may stand out by themselves. When grouping into clumps the tallest-growing specimens should be placed in the centre, and along the border, the smallest shrubs should come to the front so as to blend the grass with the taller trees in the background.

Beautiful color combinations and contrasts, both in flower and foilage, may often be arranged if the planter understands his work. For instance, a beautiful color contrast is obtained by planting a purple-leaved barberry near a golden-leaved spiraea or a dark Austrian pine as a background for one of the light-colored Colorado spruces.

Vines and Climbers. Among the vines and climbers we have a number of beautiful species which may be made very effective in many ways in beautifying the home surroundings. They are particularly valuable on small grounds and town lots, as they take up so little room, but they are also quite as valuable in beautifying a country home. One of the most hardy and vigorous is the common Virginia creeper. This is excellent for covering a summer house or an unsightly wooden wall. As a covering for a brick or stone wall the Boston Ivy (Ampelopsis Veitchii) is one of the handsomest. In northern sections it requires winter protection for the first few winters, but when once established it grows rapidly, and will soon convert a brown or red front into a wall of living green. For a handsome, hardy-flowering climber we have nothing to equal Clematis Jackmanni, with its large purple flowers; and Clematis paniculata, with its innumerable small white flowers late in the fall. Hall's climbing honeysuckle and the Chinese Wisteria are beautiful climbers, well adapted to climbing verandah posts or festooning a balcony, but they will not stand our winters without protection except in the southern parts of the Province.

Walks and Drives. These are not in themselves very ornamental, but they are necessary and have an important effect in the appearance of a place.

When properly located they convey the idea that the place is inhabited, and they seem to impart an air of welcome.

As the walks and drives are artificial, and not in themselves ornamental, there should be as few as possible. Business roads should as a rule be straight, but pleasure drives give more pleasure if they are laid out in graceful curves. The curves give variety and help to relieve the angular outlines of the buildings. They should not, however, be introduced at the expense of utility, and should offer no temptation to take short cuts across the grass. Whenever a curve is introduced there should be trees, or some object in the road to make the curve appear necessary. If such are not there when the drive is laid out, they may be planted afterwards. A curve without some apparent cause for it looks meaningless and affected.

The drive, whenever possible, should enter at the side of the lawn, and curve gently around towards the buildings as though it were the nearest and most natural way of approach. It should be dotted here and there along the side with trees and shrubbery, which partly screen the building from sight, so that we keep getting a different view of the house as we approach. This gives variety and pleasure, and always leaves just enough unseen to make us feel like following it up to see where it leads to.

The width of drives and walks should vary according to their length and the amount of travel upon them. If long and much travelled the drive must be wide enough for two rigs to pass easily, but if short and not so much used, 8 to 10 feet, or room for one wagon, is enough. Walks or footpaths will vary from 3 to 5 feet. The drive and walks should be properly graded and made slightly crowning from the centre to the sides so as to give good drainage. If good gravel is obtainable they should be covered with gravel, raked smooth and rolled hard.

Fences. As a rule fences enter largely into most landscapes, and are worthy of note. They are artificial materials, and at best they are necessary eyesores, but in the majority of cases their necessity is only imaginary. If all of the really unnecessary fences were removed, and the ground which they occupy levelled and seeded down or put under crop it would make a wonderful difference in the appearance of the country. It would remove a great harbor for weeds and insects; it would effect a great saving of labor and expense, and it would remove one of the most striking features which advertise the slovenly farmers all over the country. The only fences necessary, or which should be necessary, are those for the purpose of fencing in stock, and not fencing out that of our neighbors. Fences, in many cases, might be movable or temporary. Roadside fences in many sections might be dispensed with, the ground levelled and seeded and the grass kept mowed from the boundary to the roadbed. Bill Nye says that "the farm without a fence in front of it looks as if the owner were honest and thought his neighbors the same." If a permanent fence is necessary let it be as inconspicuous as possible, or let it be an ornamental hedge.

Some of the other artificial materials sometimes used in landscape gardening are trees, trimmed into fantastic shape, fountains and statuary, flower beds of geometrical designs. All these are artificial and should be used with as much discretion as one should use in wearing fine jewellery. The more the artificial prevails in the general surroundings the more these can be used without giving offence. In proximity to large and expensive buildings, or in extensive parks, they may have their place, but on the farmer's lawn, where most of the surroundings are natural, and where the buildings are not elaborate and costly, they would be altogether out of place.

Q.: Does not the elevation of the lawn depend on the relation to the street,. and the position ?

A.: Very often it does, to a certain extent.

Q.: Is there any possibility of ridding a lawn of dandelions ?

A.: If the lawn is given a top dressing of manure in the winter, the grass comes up so quickly that it crowds out the dandelions.

Q.: Is it any advantage to leave the clippings on a lawn?

A: They may be left if the grass is kept short, but if the grass is allowed to grow too long it is injurious to leave the clippings, and they should be raked off.

Q.: Is potash good to use on a lawn?

A.: An ordinary application of potash is good.

A Member: Tobacco dust is very good on lawns. It is excellent to drive away ants and insects, and to brighten the color of the grass.

Q.: Should the elm be left in its natural state, with branches right at the trunk?

A: Yes; feathered up the trunk with little short branches. Leave the little branches along the trunk if they are there. I like to see the elm in its natural state.

Q.: How high should the Colorado Spruce grow?

A.: I have seen specimens about 18 to 20 feet high. They very seldom grow more. They are very hardy and of more striking beauty than the others.

Q.: Is there any variety of lilac that will not sucker?

A.: That is the great objection to any of the lilac family. Still I would not try to prevent them. They get into a clump. It is not necessary, however, to let them spread too far.

Q.: Should the Clematis be cut down each fall?

A.: It is not necessary. I would not like to cut them down too much. They can be cut back to some extent, but not too far. Leave most of the old cane on. If you wish to cover a large surface, leave the old vine on, but if not cut some of it off.

Q.: Professor Hutt did not mention the Schwedleri maple. I would like to ask if he likes that?

A.: I do. I think it is a very striking maple. We have fifteen or sixteen varieties of maples on the lawn, and in the spring that is the most striking one of the lot, with its copper-colored or blood-colored leaves.

Q.: Is the purple beech a hardy tree?

A.: Very hardy, but hard to transplant, and very slow in growing. For a purple tree, however, Prunus Pissardii, or purple plum, will hold its color better than anything I know of. It holds its color the whole season.

Mr. Race: I am surprised that some of you did not ask Mr. Hutt what kind of a maple he would have you grow on your streets. He could answer it very truthfully by saying, any kind of maple rather than none at all. Nature has done much for your town, but you have not done much for yourselves. In our town every street is paved below and shaded above.

WINTER WINDOW GARDENING.

By Wm. Hunt, Ontario Agricultural College, Guelph.

The most important feature necessary for success in winter window gardening is the window itself. A window in a bright sunny position where a temperature of about 50 to 55 degrees can be maintained at night with a day temperature of from 60 to 70 degrees, will furnish the most desirable surroundings in which to grow successfully a collection of window plants in winter.

Many plants can, however, be grown under less favorable circumstances. Ferns, selaginellas or exotic mosses, aspidistras, Ficus Elastica or Rubber plant, Cyperus alternifolia (Umbrella plant) or even the Arum, or Calla Lily, as it is usually termed, are some of the plants that can be grown in windows having a more northerly aspect, where the direct rays of the sun never reach in winter time. But for flowering plants a more southerly aspect is necessary to secure good flowering results; a window facing the southeast being perhaps preferable, as it escapes the direct rays of the sun at noon, that sometimes even in winter time strikes much too warm in a south window for the well-being of many window plants. It is desirable on very bright days, especially in late winter or early spring, to shade plants in windows having a southerly aspect, by pulling down the blinds or by partially closing the shutters for an hour or two during the hottest part of the day.

A very high temperature at midday and perhaps an equally low temperature at night is not beneficial to the growth of plants, and often induces an attack of insect pests, or of disease, that prove disastrous to a whole collection of plants. An ordinary equable house temperature, such as I first mentioned, with as moist an atmosphere as possible maintained around and about the plants, will be found the most desirable conditions for the successful winter culture of window plants.

To secure the last mentioned condition in ordinary windows is often a difficult problem, as the surroundings are not adapted for using much water around and about the plants. Much can, however, be done by spraying or sprinkling the foliage of the plants on fine sunny days, more especially the smooth or glossy-leaved varieties ; or by sponging the leaves of these with a sponge and some clear tepid water. About once in every two weeks will suffice for this sprinkling or sponging. The plants can perhaps be removed to the kitchen sink occasionally, where no damage can be done the surroundings by sprinkling.

Hirsute or hairy-leaved plants should not be sponged at all, Rex begonias objecting most decidedly to this procedure. Geraniums, heliotrope, coleus, etc., do not require much, if any, syringing or dampening of the foliage; whilst Calla lilies, Fuchsias, Roses, Rubber plants, Cordylines, and other smooth foliage plants delight in a sprinkle or sponging with clear water very frequently. Always choose a sunny warm day for this operation, and at a time when the thermometer registers about 65 degress in the window, or wherever the operation of sponging or syringing is performed.

Much might be said as to the construction and planning of a suitable window and fittings, in which a collection of window plants could be successfully grown, but time will not permit. I feel quite justified, however, in saying that with the increasing interest shown by our people in the culture and growth of plants and flowers around the home, that architects and home builders might well make this matter of suitable window building a much more prominent feature in their building plans than they have hitherto done. There is no reason why even the smallest villa or cottage could not have a window so constructed, that the necessary overhead light and the necessary heat could be obtained, without adding but very little additional expense to the building estimates of a residence.

Watering Plants. This is a matter that often troubles the plant grower considerably. No set rule can be given to suit all kinds of plants and their condition, but it is always safe to give any plant that is in a good growing condition a good supply of water at the roots whenever the top portion of the soil shows signs of dryness. Giving the plant a small quantity of water at stated times or at regular intervals, is not the right method to adopt in watering plants. Ascertain first by closely observing the top of the soil in the pot, whether the plant requires water or not. If the soil appears dry, give sufficient water to thoroughly moisten (not sodden) all the soil in the pot, and do not water the plant again until the soil show signs of dryness again. It may be one day, or it may be a week or even a longer time before it requires more water; but when water is given the plant, see that it gets sufficient to well moisten all the soil in the pot.

Another method of ascertaining whether pot plants require water, is to tap slightly the side of the pot with the knuckles. If the pot when struck emits a ringing sound, the plant requires water. If on the contrary only a dull thud-like sound is given out when the pot is tapped, water had better be withheld from the plant for a short time.

Over-watering, over-potting, and insufficient drainage are often the main causes of failure in the culture of window plants.

Over-potting is a term used when a plant is potted into a pot two or three sizes larger than the plant requires.

For drainage in pots there is nothing better than small pieces of broken flower pot. About an inch in depth of broken pot can be usually used for six-inch pots and larger sizes, whilst half that quantity can be used for smaller-sized pots than four-inch. Use small pieces of broken pot for the small pots, half an inch square being a good average; whilst larger pieces should be used for the larger-sized pots. Coal cinders or coarse gravel can also be used for drainage, but these are more liable to clog and choke than broken pieces of pot.

This matter of drainage is one of the most essential points necessary to success with almost all pot plants, more especially window plants.

The insect pests that are all too common to house and window plants, have been very ably described to you by Dr. Fletcher, as well as preventives and remedies recommended for the attacks of these troublesome and destructive visitors, so that it is unnecessary for me to speak on this matter. Suffice it to say that much can be done to prevent the attacks of insect pests by endeavoring to give window plants as nearly as possible the conditions I have mentioned, as extremes of heat, drought, or moisture are the main inducements for insects or disease to attack plant life at any time.

To succeed with a collection, or even a few window plants, they must be closely watched, always keeping in mind the old adage : "That an ounce of prevention is better than a pound of cure."

To secure a bright healthy-looking collection of plants during the winter, it is necessary to commence preparations during the preceding summer and autumn months. It is useless and unnatural to expect plants that have been doing duty as decorative plants on the lawn or in the flower border all the summer, to continue in their brightness and beauty in the winter as well. Plant life of all kinds, demands more or less of a resting period at some season of the year, no matter whether they are plants from a tropical or a more temperate zone.

The all-enduring geranium even, will not meet the exacting demands for continuous flowering that is sometimes made on it by plant lovers.

If geraniums are wanted for the window in winter and give good results, they must be grown specially during the summer for that purpose. By striking a few cuttings early in the summer and growing them on in pots out of doors, nice plants can be had by autumn to take into the house. Small plants at planting out time in early June, potted into six or seven inch pots, and the pots plunged to the rim in the ground until fall, will make nice plants for the window in winter. The tips of the growth should be pinched back until August, and all bloom buds as soon as they are seen kept pinched off until September. By plunging the pots in the ground they require less water and make better plants, than if they are left standing above the ground.

Many so-called spring flowering bulbs make ideal pot plants for the window in winter, in fact, I know of no class of plants that give such good results with so little skill and care required to bring them to perfection.

The one great point to be gained to be thoroughly successful in growing these bulbs is to secure a good root growth before top growth commences.

The only way to do this is to give the bulbs as nearly as possible the same conditions for a time, as they receive when planted in the open ground.

By potting a few of the various kinds of bulbs suitable for pot culture at intervals from the end of August to early in December and burying the pots in coal ashes, sand, or light soil a few inches deep, for a month or six weeks or even longer, a good supply of roots will be obtained, when the pots can be brought in at intervals to the window as required. When the bulbs are first potted the soil should be thoroughly watered. If well packed and covered with ashes, etc., as before mentioned, they will require no more water until they are brought out into the window. After this the soil must never be allowed to become quite dry in the pot. A damp, cool place suits bulbs best to make roots in.

Roman Hyacinths can be potted in August and plunged out of doors until October when they will be ready for bringing into the window as required. There is no bulb that will give more satisfaction than the Roman Hyacinth—the white variety being preferable, if treated as I have described, as they give such a plentiful supply of their sweet-scented waxy white flowers in return for the small amount of care they require, and besides they are not very particular about the kind of soil they grow in, provided it is not of too heavy a nature. This remark as regards soil will apply to almost all kinds of bulbs used for pot culture.

Dutch Hyacinths and several varieties of Narcissi-Von Scion, Poeticus, and the Trumpet Narcissi, are among the best and easiest varieties of bulbs to grow in a window, although the Jonquils and other types of Narcissi than those mentioned succeed splendidly as window plants. These last mentioned species of bulbs are later flowering than the Roman Hyacinths and do not usually come into flower until February or later. When potting these later flowering bulbs, it would be advisable to bury the pots in the cellar, or plunge them in some position where they could be protected from very severe frost. A certain amount of freezing will not hurt them, but it is difficult to remove the pots without injury when they are frozen too hard.

All potted bulbs require plently of water after they are brought out to the light, that is the soil should never become really dry at any time.

In potting bulbs, the top or apex of the bulb should be barely showing above the surface of the soil. Three Roman Hyacinths and three or four bulbs of Narcissi can usually be planted in a four or five inch pot. In the case of Dutch Hyacinths one bulb to a four-inch pot is usually sufficient.

The Freesia is another useful and easily-grown winter flowering bulb. Plant five or six bulbs in a four or five inch pot in the manner described for Hyacinths, etc., but do not bury the pots under ashes or soil. Stand the pots in a fairly sunny position in a temperature of about 50 degrees or 60 degrees, and water sparingly after the first watering until growth has well commenced. The first Freesia bulbs can be potted in August, and as often as required afterwards until November. The delicious odor from only a single spray of these flowers will perfume a large house. Late-planted Freesias should be started in the window.

The Arum or Calla Lily should be kept nearly or quite dry during the summer months. The best place for these lilies during the summer is to lay the pots on their sides about the first of June or as soon as they are out of flower. A shaded position under trees or in the shade of a building or fence is a good place for them whilst dormant. Re-pot them in August, if necessary, but do not over-pot them, as too large a pot often means a lot of leaves and no lilies. Give the plants lots of water whilst they are in a growing condition, never allow the soil to become quite dry. Some drainage placed at the bottom of the pot when re-potting is advisable. Use light, rich soil for Callas.

Many varieties of Begonia make splendid window plants for winter. Among the most satisfactory is the beautiful golden blotched-leaf variety, Begonia manicata aurea, this is, in my opinion, the best window Begonia we have for winter time. Begonia argentea guttata is also another useful variety, also the Paul Bruant variety. The Begonia incarnata rosea, with its pretty pale. pink blossoms, that it produces so freely at Christmas time is another that should not be overlooked, but it is rather more delicate than those first mentioned.

The Rex or ornamental-leaved Begonias make pretty window plants. Many people fail with these Begonias from placing them in a sunny position in the window, and by over-potting them.

All Begonias like a light soil to grow in. One-third of fine sharp sand and two-thirds of fairly rich, loamy, potting soil makes a good admixture of soil for Begonias. A little well rotted leaf soil mixed in will be beneficial. Use nearly an inch of drainage in the bottom of the pots when potting Begonias. Begonias like a temperature of 65 to

70 degrees, but do not like very much real hot sun, preferring partial shade, at noonday especially.

Many more varieties of Begonias could be mentioned, but those I have named are among the best for windows in winter.

A very easily grown and effective window plant is the Anthericum picturatum. Its pretty striped foliage makes it a bright conspicuous feature at any season of the year, more particularly in winter, its silvery ribbon-like leaves contrasting very prettily with the almost universal green of the foliage of winter window plants. These plants like a temperature of about 65 degrees, and require a rather shaded position in the window. Plenty of water should be given them, as a very dry condition of the soil often results in serious injury, and perhaps the total loss of the plant, if the drought is of long duration.

There are many other species of plants suitable and comparatively easy of culture in windows, but time will only allow of a few being mentioned. Amongst them is the Cyperus alternifolia or Umbrella plant, that delights in a warm partially-shaded window, where the sun does not strike at noonday. Given this position with plenty of water at the roots, and its foliage also given a dip once or twice a week in water, its whorls of delicate green leaves will retain their freshness much longer than if they are kept in a dry overheated atmosphere.

Many varieties of Cactus also help to relieve the sameness that a collection of window plants often present in winter. Cactus like plenty of drainage in the pot, plenty of sand (nearly half) in the potting soil, and not too frequent watering. The Lobster cactus (Epiphyllum trancatum) as well as a few of the quicker growing cactus of the Phylocactus type may like a little richer and heavier soil, but there is danger even to these unless plenty of drainage is given, as well as care in watering, as they are very liable to rot at the base of the growth, especially if over-potted.

The Farfugium grande, (Leopard plant) is also a good window plant, its thick leathery gold-spotted leaves being particularly noticeable in a window. It delights in a rather cool, shaded window, requiring plenty of moisture at the roots. This is one among the few plants that succeed better in a window than in most greenhouses. It is seldom a good specimen is seen in a greenhouse, whilst handsome specimens a foot or two in diameter are often seen in dwelling house windows, as well as on verandahs in summer.

The Ficus elastica (Rubber plant) is a good, enduring window plant. Its leaves require sponging frequently to increase and preserve the glossy green of its foliage, the latter, together with its power of resisting gas and the bad effect of a dry atmosphere, being its chief points of recommendation as a window plant, as it is not of a very graceful appearance, even under the very best conditions.

Amongst climbing or trailing plants the several varieties of Tradescantia or Wandering Jew, as well as the variegated Japanese Vincas or Periwinkles, cannot be omitted. The Saxifraga sarmentosa (Spider Wort or Mother of Thousands) is also a splendid plant for a hanging pot or basket in a window.

The rampant growing plant known as the German or Cape Ivy is a grand climber for the window, a single plant often covering the entire window.

During the address practical illustrations were given by the lecturer of the methods of propagating most of the plants mentioned. The method of propagating the Ficus or Rubber plant by mossing partially severed cuttings whilst the branch or cutting is still left on the plant, was most interesting. Cutting up the leaves of the Rex Begonia into disc and sectional cuttings from the leaves of these plants was also fully illustrated and described, as well as the best methods and seasons of the year for propagating them. Propagation from terminal cuttings from plants such as the fuchsias, geraniums, begonias, etc., was fully illustrated and explained, as well as sectional stem cuttings and raising plants from root cuttings, natural specimens being used in different demonstrations made during the progress of the address.

It was also explained that clean, sharp, fine sand placed in well-drained pots or shallow boxes was the best material for rooting cuttings of most window plants, the summer time being the season when success was most likely to crown the efforts of the amateur in increasing his stock of window plants from cuttings of any kind. The best kind of soil to furnish the basis of a good potting compost for window plants is obtained from cutting sod from a pasture field, where the soil is of a loamy nature, and the grass kept fed down. Cut the sod about four inches thick and the size over of a spade. Make a pile of sufficient size of this sod by first laying two thicknesses of sod, with the grass side downward, then put about the depth of one sod, three or four inches, of cow manure. Continue this succession of sod and manure until the pile is large enough. Make the pile outside, in any corner of the garden, away from chickens and animals. In six months it will be ready for use. The compost can be tempered with sand or leaf soil as required, for plants that require very light soil, such as Begonias, Fuchsias, Ferns, etc., but for Geraniums, Roses, Bulbs, and the majority of window plants, the sod compost will suit splendidly, especially if the sod is taken from a sandy, loamy soil.

Q.: When your tulips are done blooming, do you take them up every year ?

A.: No ; I take them up every third year. Your soil up here is much better than our soil for growing tulips. If I were in your soil I would put my tulips in at least six inches. As soon as they are done blooming, I take a very sharp hoe and take them off right close to the ground, and the stem that extends from the surface is quite sufficient to develop that bulb. Do not pull it, because if you do you will break the bulb. I leave mine three years,. and take them up every third year. It is not at all necessary to take them up every year.

Q.: Is it allowable to give them a shady site, or is it necessary to give them a southern or western exposure ?

A.: You will probably get a more brilliant display from a sunny situation, but tulips will do well even in the shade, or partial shade, and, the tulip being early, the trees are never in full leaf when they are blooming, and the shade is never very heavy at that time. I know of a case at home where on the north side of a house the tulips were more than two weeks later. They grow a little later, and a little more delicate in the stock when given a shady position. You can retain flowers much longer in the shade than in the sun.

Q.: Tell us how to cut them for bouquets.

A.: Those cut when they are shut up keep much longer. As with all flowers, the proper time to cut is in the morning. Take, for example, the rose. As soon as the sun comes up early in the day it opens up. But if you cut it early in the morning, it will remain all day. It is better to cut all flowers in the morning, especially the gladiolus.

Q.: I would like some information regarding the Wisteria. I have a large plant that makes a great deal of growth, but does not bloom. Would it be possible to transplant it, and what care would need to be exercised in trying to transplant it ?

A.: With regard to the Wisteria, like all clinging plants, when they get very large they are very hard to transplant. In this case it seems to me that it would not be wise to transplant after it has grown to a large size. I had one for over twenty years, and it flowered regularly, though it was a great many years before it started blooming ; very often that is the way with the Wisteria.

Q.: Would it be possible to train these on to a trellis ? Each one is near a verandah, but not on a trellis.

A.: I do not think that would have any effect.

Q.: What is the proper method of pruning the Wisteria ?

A.: Thin out the young saplings so as not to let them grow too thick. I saw a Wisteria between forty and fifty feet thick. It was a great age. I bought a Wisteria about fifteen years ago, and planted it, and it was nine or ten years before it showed any signs of flowering at all, and when it did, it was a very poor blossom. I am inclined to think that some are not true to the original type of Wisteria, the Chinese Wisteria.

Q.: But this was much smaller than the Chinese variety, a different variety and different growth.

A.: It is quite possible that you may have one of that kind. It is very similar to that kind of Wisteria. If you can, get it when it has leaves on and compare it with the Chinese Wisteria. You can soon tell. There was a question asked in Toronto lately on the same subject, and I tried to answer it as best I could. The Chinese Wisteria takes several years to flower. I would not advise you to transplant it. I would rather leave it; just partially sever the growth, peg it to the ground, and allow it to root there, and transplant it to the east side of the house.

Q.: And just destroy the old plant?

A.: Of course, it is just a matter of whether you feel like giving it place or not. Some I know leave it.

Q.: What would you consider the best half dozen varieties of roses to have?

Mr. T. H. Race, Mitchell: I would advise something different here to what I would have in my own district. I have given special study to the rose, and have also specially studied our own country. You could produce roses here that I could not.

We will start with the darkest rose. Take the Baron de Bonstetten to begin with. Next take the Jacque, the General Jacqueminot. The next in color would be the Alfred Colomb. Then take the Francois Levet, a beautiful thing, and a strong grower. Next, the Mrs. J. H. Laing, then the Magna Charta. Paul Neyron comes next; then another beautiful rose, the Madame Gabriel Luizet. Again, I do not like to leave out the Mrs. Sherman Crawford, a magnificent rose. There is no white rose that seems perfect. I think that will be enough for you to start out on.

Q.: Do you think it possible to winter the tea rose outdoors? I met a gentleman from Ingersoll who said he had been wintering them for several years by putting a layer of earth and then boards over them.

A.: In my own town I grow very healthy tea roses in the air. I would hardly recommend tea roses, however, as you are liable to disappointments, and it is far better to cultivate a taste in people by a few really hardy roses than to start on these.

Mr. Hunt: I think that is just the right plan. In regard to tea roses, I grew the tea roses planted out in greenhouses on a bench, and after they had stood there a winter in the greenhouse temperature, and were through flowering, they were taken off the benches, and planted in a sheltered quarter outside with an eastern exposure. It is a very favorable site, and they have stood there for two years, and last September I had the pleasure of picking some roses from these same plants. At the same time, I consider that an exception. These succeeded well, though unprotected, but I do not consider them hardy, and do not advise to plant them. Down in that section of the country sometimes tea roses will come through, but we have had very mild winters, and this is the exception rather than the rule.

Q.: Would a man get good results by planting tea roses each year, like any other plant?

A.: Yes, under certain conditions, but it would be necessary to have very large plants, and this would be very expensive. You would need them about two years old to get good results, and these are about 75 cents a plant. I would not advise this, unless you want to make a specialty along that line.

THE COLEUS AND OTHER FOLIAGE PLANTS.

By J. S. Scarff, Woodstock.

I am afraid that our Chairman has led you to believe that you will receive something from me that I cannot give.

Before beginning my address, I would like to say that we have a live Horticultural Society in Woodstock. I regret very much that citizens of your town have not taken more interest in horticulture than they have. I expected to come here and see a large display of house plants and foliage which would surprise the most of us people. I am somewhat disappointed in that respect. Our Horticultural Society in Woodstock has done a great deal there. It takes a very active part in our municipal affairs. Anything that we think is required for the beautifying of our city is easily supplied by our society. Anything that we think is going to be to the interest of the city in decorating any public grounds, the request is laid before the School Board or Council. By that means we have our public buildings and schools very nicely decorated with shrubs, plants and flowers. We also offer a very great inducement to our scholars at the schools. We distribute amongst the scholars a great many plants in the spring of the year, and bulbs in the fall. This last spring we distributed a great many plants and flower seeds to the scholars, and they were requested to bring plants and flowers to the fall fair, where we have an exhibition of flowers and plants, and they are awarded premiums in the shape of bulbs This fall we have distributed a lot of bulbs to our scholars for the exhibits which they made at our show. We also distribute very largely to the members of our Horticultural Society. A short time ago we distributed nearly five thousand tulip bulbs to our members free of cost to them. So we are working along this line. Anyone who has visited Woodstock will observe that we have no fences there. Everything is open to the public. That all originated with our Horticultural Society. If we are not able to succeed in carrying out our schemes that we proposed to the Municipal Council, we make it very warm for them at the next municipal election. By this means we have been able to do a very great deal of good in the way of making our town beautiful.

I feel like congratulating ourselves upon the very favorable auspices under which we have met here this year, and to find so much enthusiasm manifested here in this meeting. Also to see so many ladies in the audience, which is very gratifying to us. It is our desire to cultivate those features in our meetngs which will reach the ladies and interest them in the beauties of nature.

The subject of "The Coleus and other Foliage Plants" which has been assigned to me is one of great importance to all lovers of Floriculture. It may be regarded from so many different points of view, that it is difficult to say which should have priority of consideration. It must not be expected that I am going to enter upon this subject very fully, but will confine myself mostly to the Coleus and a few of the fancy-leaved and decorative plants and their treatment. And if my paper shall be the means of promoting one admirer of the beautiful and good to greater effort to make home more attractive by beautifying his or her home with a few Coleus and other foliage plants distributed here and there about the grounds surrounding the home, I shall consider myself well paid for my effort. No greater evidence of progress in fine arts can be produced than such careful attention to our home approaches as will make them most attractive. A large percentage of our men consider flowers and plants as only for the pleasure of women and children. But in the new order of things it is going to be different. Already men are waking up to a realization of the fact that they have lost a great deal by not having given more attention to floriculture. It is a good sign when we see a man helping his wife with the flower beds. We know that in a little while, he will take as much interest in them as she does.

Formerly the idea prevailed among florists, both professional and amateur, that each kind of plant required a special kind of soil, and many amateurs were prevented from making an attempt to grow plants because of the amount of labor which seemed necessary in preparation of the different kinds of soils. But of late years there has been a change of opinion; that one kind of soil properly prepared is sufficient to supply the needs of the majority of plants that can be grown in the house or conservatory.

Sand is a most important factor in successful floriculture, and the coarser and sharper the sand is, the better it is adapted to the purpose. For the majority of house plants, a mixture of leaf mould, or some good substitute, with garden loam is advisable, because the vegetable matter of which it is composed is an important element of plant growth not to be found in clear loam. An excellent combination for the majority of pot plants is thus: One-half loam, one-quarter leaf mould, one-quarter sand. By mixing these together well, you have a soil which nine-tenths of the plants adapted to house culture will thrive in. For fine-rooted plants leave out half of the loam, and double the amount of leaf mould or its substitute.

So much for the preparation for pot culture. If to be planted in the garden, well prepared beds with good drainage is all that is necessary. Having prepared the soil, etc., now the obtaining of plants. Everything must have a beginning, and domestic floriculture is not an exception to the rule. Plants must be procured. Full-grown plants can be purchased from the florists or accepted from friends, but it is far more satisfactory to have grown your own plants from seeds or cuttings.

There is a fascination in growing Coleus from seed. These showy plants are grown extensively for their brilliant-hued foliage, and used extensively in our large parks and lawns. Some of the new varieties are very beautiful, large, broad leaves of deep velvety coloring. These leaves will average six to seven inches in length, and nearly the same in breadth. In the new Sunset strain the surface of the leaves is heavily crimped, and the coloring is of a rich purplish tone, brightened by crimson veinings. The diversity of shades and combinations of color are so varied that it is hardly possible to find two plants exactly alike.

The New Gigantic Copper-leaved is a grand new variety, and comes so entirely uniform that the home gardener as well as the florist can grow a supply of plants for setting out a bed of these beautiful foliage plants to produce a solid color effect. The growth of the plant in this variety is strong and vigorous, with extremely large leaves. The ground color of the broad leaves is a deep golden yellow, heavily overlaid with rich reddish brown, almost as bright and velvety as the well-known Verschafelt variety. The rich, yellow ground coloring shows out clearly at the base of the leaves, and in a narrow margin around the edge, as well as in the under side of the leaf, it tones and enlivens the richer and darker coloring, and gives the distinct coppery tint from which the variety takes its name. They are so easily grown from seed, the seeds germinating rapidly, and the plants being of quick growth, can be easily raised in a small box with a pane of glass covering it, placed in a sunny window of a warm room in the month of March, or in a hot bed. In a few days the little seedlings come to the surface, and from day to day are changing color. What a delight it is watching them develop and wondering what colors each day will bring forth.

When a plant begins to wilt, and the foliage has a flabby, half-wilted look, and shows signs of ill-health, which cannot be attributed to lack of moisture in the soil, or too much heat and sunshine, it is safe to conclude that the trouble is at the roots, and an examination will generally show that some of the roots are diseased. The unhealthy condition may come from too much or too little water, or from worms, which often attack the young roots and sap them of their vitality. These generally come from using barnyard manure. Watering with lime water will drive out the worms, and will usually get rid of this trouble. Apply enough to each plant to wet the soil all through, and repeat if necessary. The soil being too heavy and without proper drainage might be the cause of the trouble.

One of the most troublesome pests the grower of Coleus has to contend with is what is known as the mealy bug. It is a flat, tender, yellowish insect, and is covered with a white, mealy substance, from which the common name is derived. It is very troublesome to Coleus, and many soft-wooded plants. Picking off the bugs with a small, sharp-pointed stick is the best and safest method of keeping down these pests, or spraying the plants two or three times a week with soap suds, to which has been added a little kerosene, say, two tablespoonfuls to a gallon of suds. A very effective way is by spraying with a little alcohol.

Coleus do better in cold frames, made specially for such purposes as getting quantities of young plants ready for bedding, as all of one growth can then be had.

It is well known that many tropical plants are extremely beautiful, and they invariably prove in the highest degree attractive. Those of the tropics excel in magnificence, and they are not, as a rule, difficult of cultivation.

Crotons. Nothing can excel the beauty and richness of coloring that is found in this class of plants. They are beautiful as pot plants for the conservatory, making handsome specimens for decorative and exhibition purposes, and are used as extensively as bedding plants. They should be planted in full sun, in a position where they can be liberally supplied with water, which develops the most wonderful colorings in the foliage. These plants should be grown rapidly, and confined to a single stem. The soil best adapted for them is peat and leaf mould in about equal parts, with the addition of a small portion of rich loam and some sharp sand.

The Caladium of late years has become one of the most effective tropical plants in cultivation for the flower border or for planting out upon the lawn. They also make grand plants in pots for the conservatory or greenhouse, and are becoming more popular every year. They will grow in any good garden soil, and are of the easiest culture.

Caladium Esculentum (Elephant's Ear) is a grand tropical-looking plant, a favorite for specimens on the lawn, or for show purposes, or for bordering large subtropical groups, growing from six to ten feet high, and bearing immense leaves three to four feet long by two and a half feet wide. To obtain the best results, it should be placed where it will get plenty of water and an abundance of rich compost. The fancy-leaved Caladiums have, in recent years, grown very rapidly in popular favor, not only for the decoration of the conservatory, greenhouse, and window boxes, but nearly all of these varieties succeed well if planted out of doors, when the ground has become warm, in partly-shaded, sheltered borders, in well-enriched, light soil. Their beautiful-shaped and glossy foliage is elegantly variegated in the most telling manner. Some are regularly dotted with round, raised spots of white. Others are ribbed and veined with pink, scarlet or yellow, while others again are splashed and marbled with white, or shaded almost black.

The Ricinus (or Castor Oil Bean). Large, luxuriant, rapid-growing annuals, with palm-like leaves; much used for sub-tropical effects on the lawn or for centres of beds of foliage plants. This summer I saw some Ricinus growing on Mr. P. Patterson's grounds in Woodstock measuring from the ground to the top sixteen feet ten inches.

INSECTS AFFECTING HOUSE PLANTS.

By Dr. James Fletcher, Dominion Entomologist, Ottawa.

It was announced that I would speak on Window Gardening, but, by a different and better arrangement, Mr. Hunt is to speak on that subject this afternoon. He is to follow me, so I shall not overrun my proper time.

The subject which I have to bring before you is a very simple one, and a very short one, but one which may be explained to any extent.

There are only three or four classes of insects which attack house plants. Those who grow roses, think that the aphis is the very worst insect they have to contend with, but all will not agree with them that this is the worst insect, because those who grow foliage plants of the genus Coleus and Cacti have more trouble with the mealy bug; so they say that that is the worst insect. In short, the worst insect is the one which gives each individual the most trouble, and there are several kinds of insects which attack house plants, each of which must be considered by itself. Now, all of these different kinds of insects can be treated with comparative ease, if their habits are studied a little. House plants are a good deal like children, and the growing of house plants is much like the training of children. They have to be disciplined, fed, and kept clean. There is nothing which will keep children in better health than feeding them regularly and washing their hands and faces often, and plants are the same. Washing them at short intervals will keep them free of nearly all the insects which attack them indoors. No one can grow flowers who does not like them well enough, and does not get a good deal of pleasure out of taking trouble with them, which in a very short time will bear fruit in a knowledge of how to do things in the best way. Now, roses are considered by most people as very difficult to manage in the house, but our friend Mr. Race here is so fond of roses and has made such a success of growing them for a great many years, that he will tell us that there is no difficulty whatever in growing roses. This simply means that he knows how to do it. He will tell us that his greatest insect enemy is the Rose Aphis, and this is certainly a bad enemy, unless it is attended to.

One of the first things to consider when we decide to grow flowers in a window of an ordinary house is the extent of our window room; for, those who grow house plants most successfully, find that it is better to confine their efforts to a few plants and let those do their best, than to fill a window up with a great many plants, none of which have sufficient room to develop properly. The soil in which plants are grown must, of course, be considered. With proper conditions of room, soil, and moisture, anyone who is fond of plants, can get flowers at almost any time of the year, and, with the added knowledge of what to do when they become infested by injurious insects, he will have much more satisfaction in his labors. Let us suppose that we are growing roses, and some fine morning discover that they are infested with plant-lice. What shall we do to get rid of these enemies? There are for every kind of insect several different kinds of remedies, and what we want to find out in every instance is what is the simplest remedy for us to apply. Plant-lice are sucking insects, that is, they live upon the sap of plants, which they such up through a hollow tube with which they have pierced the tissues of the plant, causing it to wither and die, because the sap is its blood. From a lack of knowledge of the structure of insects, many people use the wrong remedies when an insect appears. One of the commonest mistakes is for people to use Paris green as a remedy for plant-lice. Knowing that this material is very destructive to the Colorado Potato Beetle, they suppose that it will kill all insects; but this is not the case. The potato beetle is a biting insect, which devours the whole substance of the leaves; but a plant-louse lives only on sap, which it draws from beneath the surface of the plant, and thus never gets any of the poisonous Paris green into its stomach. For sucking insects, then, we cannot get any poison into the sap which they live on; we must use some remedy which will kill them by merely coming in contact with their bodies. Among the best of these are various kinds of soaps, to which may be added tobacco in various strengths; or the proprietary substances known as tobacco soaps, or nicotine soaps, may be used. Coal oil also is extremely useful, and, when emulsified with soap in certain well-known proportions, which I shall be glad to give to anyone on a printed slip if they will apply to me for them, may be used even upon delicate foliage without injury. For large greenhouses, perhaps the most economical treatment, although a rather dangerous one and requiring a great deal of care in its application, is fumigating with hydrocyanic acid gas, which is generated by putting cyanide of potassium into a jar containing sulphuric acid and water. All kinds of insects can be killed with this gas; but it must be remembered that so also can all animals, including human beings; therefore, this remedy must not be used in the dwelling house or by those who do not understand its danger. For the ordinary dwelling house we must use something simpler and something that is easily obtained. Perhaps the most useful substance for the ordinary flower grower is common laundry soap, and in those houses where the occupants have been educated to an appreciation of a value of that most useful herb, tobacco, a little of that can be added to any mixture made. It will increase the content of the flower grower, but add very much to the discontent of the wicked insects who do not appreciate it. If anyone objects to tobacco, either as smoke or in a decoction, the soap alone, if used often enough, will answer. A most useful soap for all insect-killing work is carbolic soap, or tar soap. Another substance which will kill many insects and which is not objectionable to anyone, is pyrethrum insect powder, which is known in the trade simply as insect powder. This has a very curious fatal effect upon insects. You know insects are not quite like we are. We have one mouth, but an insect has a great many mouths. An ordinary caterpillar has nineteen mouths, one to eat with and eighteen to breathe with. The effect of this powder is that when distributed in the air it paralyzes the muscles which close and open these breathing mouths. They are closed up at once, and are paralyzed so that they cannot open again, and the insect dies of suffocation. It is well known that it is very destructive to house flies, when distributed in the windows. Every time they come to the window they come within the influence of a poisonous volatile emanation from the powder, which destroys them. Dusting rose trees covered with plant lice with the insect powder makes many of them drop from the plant, so that the washing with soap afterwards is very much easier.

There are no plant insects in houses which need to be poisoned with Paris green. This material is very poisonous, and it is not advisable to use it in a house. It is well to remember that Paris green is neither a necessity nor useful remedy for house use.

The next insect that I shall speak of is not an insect at all, and that is the red spider The red spider practically is an insect, and is in no way related to the spider—it is a mite. When it gets on house plants, particularly in those houses which are over-heated, it is an exceedingly difficult pest to get rid of. There is one thing which will eradicate this insect, that is, sulphur. The sulphurous gas which is given off is fatal to them.

To remove scale insects of all kinds, give the plant a good washing. Put your hand on the top of the flower pot, put a piece of paper underneath, and spread your hand to hold the plant from falling out. Then turn it upside down, and with soapsuds give the plant a good washing. If it is a large plant like some of the cacti, or palms, washing is a very difficult matter. Then, you leave it standing in its pot and take a piece of flannel, which is about the best thing to wash a plant with. With ordinary soap you can wash off nearly all the scales which affect the different kinds of plants. If you get one of the carbolic or tar soaps they are much more effective than ordinary soap. All soaps are injurious to insects, and most of them are rather beneficial for putting in small quantities on the soil of your plants. The red spider is the most difficult pest to deal with, and if you have a plant, such as an annual plant, growing in your window, first of all consider, "Is it best to fight this or better to throw the plant away and get another?" for you can generally get, without trouble, some plants to replace those thrown away. Everybody who grows flowers is very fond of them, and you have only to admire them and the owners will want to give you a specimen or cutting of his plants. Therefore, ruthlessly destroy any plants on which the spiders have got such a hold that you cannot get rid of them. However, if the infested plants are such that you cannot readily replace, then trim these down very closely and wait till the new wood comes.

The next insect I will speak of which gives trouble in the window garden is the **Mealy Bug.** Upon examining it carefully we find that it is really a scale insect. It very frequently gets into the window garden on the Coleus, which is very difficult to wash, as washing spoils its velvety surface. It is also extremely difficult to clean the cacti of this insect, but we can only do the best thing possible under the circumstances. We must not attempt to rub the insects off, but rather find out how we can get the material to destroy them on the plant, without destroying the plant. As you know, alcohol is a very injurious liquid, but you will find there is nothing you can clean a plant with more easily than a little clear alcohol put right down on the bodies of the insects. If they are thoroughly saturated, the alcohol will kill them. On Cacti this is best done by touching each of the Mealy bugs with the tip of a paint brush which has been dipped in alcohol.

Scales on palms are best washed off with soap and water. In growing palms in the house we give them two conditions which they do not get in nature: one is the dry atmosphere of the house, which is uncongenial to these plants. We must try and remedy this, and we can do so in a measure by putting water into the soil in the flower pots, and also by refreshing the foliage, sprinkling frequently and washing it. Another thing which is very seldom considered is dust. Dust is one of the worst enemies of house plants, because the dust chokes up the mouths of the leaves so that they cannot inhale their gaseous food. Then the leaves do something else beside breathing. They give off moisture from the plant. You give a plant plenty of water to drink. It takes in the water through its roots, and gives off what it does not require through the holes in the leaves. If dust settles on the leaves, they cannot perform their functions.

We can help the plants also by giving them fresh air. By giving them fresh air, of course avoiding cold draughts, you will give them more health than by all the fertilizers you can buy from dealers. By doing this, keeping them free from dust, and washing frequently, you keep off many of the insects.

A plant which will stand a good deal of knocking about is the Oleander, and on this account it is generally neglected a great deal. I have seen it entirely covered with a scale which changes even the color, and instead of that beautiful dark green, it is covered with a white, scaly surface. These scales are tiny insects, which are sucking continually from the sap of the plant. If we allow them to remain there, the plants will suffer and finally die. There are many things which Mr. Hunt will tell you that will dove-tail in with my remarks, because fighting insects on house plants is only one part of growing these successfully. One of the greatest advantages of growing house plants, I am sure he will tell you, is the great increase to our happiness which it insures. In fact, it keeps us all young, better than anything I know of. I am going to be a boy as long as I live. I think that the very best thing for all boys and girls to do is to have a hobby of some sort, and they are very happy boys and girls if they find their pleasure in growing plants and flowers. This relaxation, too, is for every one, whether they know that they are fond of plants or not. Let them but get some sort of a seed, plant it, and see first of all the little seed leaves, then the real leaves, and watch the difference between the seed leaves and the real leaves, then the gradual development, until their plant flowers, and I have never yet met anyone who could not get pleasure from the exercise, and give much more to others as well.

Q.: There is a great deal of dissatisfaction in using the hydrocyanic acid gas. Some of us are afraid to use it, claiming that some plants are injured by it.

A.: Dr. Fletcher, Ottawa: There is certainly great danger in using it, for this gas is the most poisonous gas known. One single inhalation is sudden death. It is too dangerous a thing for anybody to use without definite written or printed instructions, and no one should attempt to use it without these printed instructions before him all the time. It is a gas to be used only by those responsible people who would take the necessary care. These instructions are given in the Government reports, and they can be got from Prof. Lochhead, of Guelph, or by applying to me at Ottawa.

Q.: If you put lime with tobacco water to make it adhere to the plants, is it more satisfactory?

A.: I have never tried it to my knowledge, but it might have that advantage.

Q.: What would you do for scales on ferns?

A.: The only thing is to wash them off with tobacco soap if possible, or with tar soap.

Q.: Is it better to wash the soap off?

Yes, especially if carbolic soap is used. I generally leave it on about half an hour, then wash it off with clean water.

THE WORK OF OUR HOTICULTURAL SOCIETIES IN OUR TOWNS AND CITIES.

By A. K. Goodman, Cayuga.

The work of our Horticultural Societies depends largely on the individual enthusiasm of its members. The world has been full of great messages. There has been wonderful progress and development in literature and art, in all that is beautiful and good. The message of this society is to take up the work and receive in return better health, a new lease of life. Who are to be the messengers? The local societies that we have formed. After the message is well established it becomes the message to the individual. This is to join the local society, to improve your surroundings and get a home of your own. That means that you are to get up early and live a regular life. If you study nature, the first thing that strikes you is the system about it.

A lesson that the society needs is the lesson of co-operation. See that your town is in the front rank of improvement. Keep pounding away until you fairly make the council take hold and do something. It is pretty hard for one man to go to the council and try to get them interested. It is the individual member's duty to promote an interest by growing everything he can as well as he can, improving everything, and giving the world what he can. I do something like my friend, Mr. Race, and provide all my friends and my neighbors with boxes of flowers, and it looks as though I was in the business and expected a return for it. My return is improvement in my own character, and in my other lines of work.

The most important thing around the town is the drainage, and the horticultural societies should take very great interest in that, because on the drainage depends the health of the community. Water, like men, to keep out of mischief, must be always on the move. There must be no stagnant pools. The roads should all drain to their proper watercourses, the gardens should be drained, and everything about the property should be drained. The water should keep moving. You look in a man's back yard and see nature working out her system of irrigation. There is a dry spell, and the earth opens in cracks and fissures. The heavy rain comes, and away rushes all that fever and disease into the well, and soon a typhoid fever breaks out and a loved one is lost. All this because the man did not realize the message that was brought to him by the horticultural society. Another thing, it encourages thrift about the home. Many of the crimes of the age are due to idleness. You are very lucky in the neighborhood if idleness does not lead to drink or crime.

Coming back to the home, a good beginning is the planting of an asparagus bed, or the growing of a little parsley. Get a man started, and soon he will want to show his work to everybody.

Then go to the schools. We neglect our schools. Some of the trustees neglect the school building. They will not go into the building to see if it is properly lighted or heated, or the grounds laid out properly and the children given a chance to play. I was glad to see that in Toronto Junction they have spent $12,000 in getting a playground for the school. In most cities they skimp the school grounds. If you do not begin with the children you might as well drop the work right now, because you cannot expect older people to break off their habits. You must get the children interested first.

Then go along the streets, to the different public places. The street is often neglected as to shade trees. They should exist for beauty, and for the protection of the pedestrian. Also they increase the value of property. Anything you make more beautiful you make more valuable. People will like to come to the streets. Refinement and beauty do not exist only in immense buildings, for the humblest of homes can be made a bower of roses, and there is just as much refinement and culture as there is in a large home. Ruskin say that the character of a people is displayed in their architecture. That is not true in this country, where people have to take things as they find them.

Another thing that seems awful to me is the condition of the church houses and the churchyards. This is the fault of the clergymen. There ought to be more life in their sermons. A "Nature Sermon" from a clergyman who does not know anything about it falls flat. The church grounds should be models of neatness and taste.

The promenades is another thing that should receive attention. Attractive promenades will induce people to go out walking. The tongues get a great deal of exercise in this age, but the legs do not get so much. There should be more walking, more exercise.

Next as to the driveways. There is no excuse in this country why any man should not swim and shoot and ride and be pretty good at any kind of sport, and the driveways and promenades would encourage more of that sort of thing. I am a great believer in keeping up the driveways.

Another thing is the roads leading into the towns. Good roads are a great assistance in building up a town. I have known many towns to be stunted because the roads are not in good condition. Trade moves to the best centres of transportation.

The horticultural societies should encourage individual gardening by displays, premiums, and by teaching people of the work and how to do it. If there is any religion in a man at all, when he comes into the garden his nature becomes uplifted. He remembers that the Lord walked in the garden. The Lord walked in the garden of Eden. The Lord of Life walked in the garden of Gethsemane, and in the garden was a grave. Every man's life is a garden, and in every man's life is a grave. Man is the finest flower of God's creation; therefore, in your garden let there be order and beauty, and a constant striving to attain better results.

A very good idea is to go to the public gardens of our towns and rub shoulders with the gardeners, the people in charge, and find out from the practical men how they are doing things. It is simply wonderful the information you can get, and in many cases you can apply it to practical use when you get home.

The horticultural society has a general tendency to uplift the town. Canada is on the eve of a wonderful burst of opportunity. Now is the time for us to take the opportunity. People should spend money in uplifting the town, and the money spent on civic improvement is not wasted.

To come to our little town, Cayuga. We had one of the dirtiest and most miserable of towns. We started our Horticultural Society. Of course Mr. Beall is responsible for the whole thing. He started the machinery and pressed the button, and we have kept it going. We have cleaned up the two schools, planted hedges, and done wonderful things there. We have spent probably $500 on these grounds since we started them. We have spent $10,000 on cement sidewalks. We have new public gardens, and now each neighbor vies with the other as to who would have the best boulevard. The first thing we knew we had landed a factory, a leather goods factory, employing forty hands, which we never would have done if we had not started improving our town. And we owe it all to the Horticultural Society.

PALM CULTURE IN OUR HOMES.

By J. O. McCulloch, Hamilton.

In this paper, "Palm Culture in Our Homes," I can only give an account of the method pursued by myself. It may not be the best method, but it has resulted in some fairly good plants, and there is no doubt that anyone, with the exercise of a little care and patience, can produce fine specimens of this most graceful and beautiful class in our ordinary living rooms ; and I hope that those who have succeeded, perhaps by some different method, will give us the benefit of their experience.

It is unfortunate that many have been deterred from attempting to grow palms, by the somewhat widespread notion, that they will not do well in the house. This is a mistake, as there are few plants that will give as much satisfaction, with ordinary care as some varieties of the palm. They will grow and thrive where any blooming plant would prove a disappointment, because they do not require the sunlight which most other plants must have.

Palm culture, like everything else, must start by procuring the palm. Any florist can supply you, but it is not so easy to say with what variety to begin. If I were advising anyone to make a start, it would be with Phoenix Reclinata or Phoenix Rupicola. These two will stand almost anything, high temperature, low temperature, fluctuating temperature, coal gas (the less of it, however, the better), and even drying out until the leaves droop, and still maintain an appearance of which no one need be ashamed. Next in order would come the Kentias, Balmoreana, Forsteriana, and Canterburyana, then Latania Borbonica and Seaforthia Elegans, followed after a little experience by Areca Lutescens and Cocos Weddeliana ; these last two are very graceful, the Cocos perhaps being the finest of all for table decoration. And now a word about buying the plant : content yourself with something of a rather small size to start with, and try and get a plant that has been grown in a cool temperature. If you get a plant that has been grown in a high temperature, the next few leaves it puts out, after having been removed from the greenhouse, will come with shorter stems than those already on the plant, thus destroying the symmetry so necessary in a palm. However, having possessed yourself of a plant grown in a high temperature, is no reason for discouragement, as each succeeding leaf, after the first one grown outside the greenhouse, will come on a little longer stem, and the plant in time resume its graceful shape. When buying, be sure your plants are well rooted, have them turned out of the pots and see that the tips of the roots are white or pink, and that there is a goodly number of them. A well-rooted, cool-grown palm may be safely removed from the greenhouse to our living rooms at any season of the year.

The first requisite of house culture is regular attention. Other plants may be injured by neglect and quickly recover, not so with the palm. The damage done by one week's neglect may require a couple of years to repair. By regular attention, I do not mean watering, or for that matter doing anything else at stated intervals, except looking your plants over at least once a day, to see what attention they need. There can be no stated time for watering plants. The temperature of the rooms may be higher one day than another, there may be more sunlight, the air may be drier ; in fact, there are a variety of causes, not easily traced, which make it possible for a plant to require water twice in two days at the beginning of a week, and once in two days at the end of it. To be able to determine whether a palm needs water or not, is perhaps the most essential thing in palm culture, and easy as it is, it has proved a greater stumbling block than anything else. Constant soaking with water has ruined many palms, and drying out has probably ruined as many more. When you water, do it thoroughly, using tepid water if it is handy, and then watch your plant until it shows signs of becoming dry before watering again. You can tell this by the appearance of the earth in the pot, by the feel of it, or perhaps, best of all, by the sound produced by rapping the pot with the knuckles. To become familiar with this last method, take a pot filled with earth and let it become dry; rap it sharply with the knuckles and note the sound, then water it and rap again, noting the difference. Have a pot that was watered the day before, rap it and you will have still another note. With a little practice you will be able to tell by this simple method whether a plant needs water or not. The only rule to be laid down is, never allow the earth to become dry enough to powder between the thumb and finger, and never keep it soaking wet. One of the best methods of watering is to place the plant in a pail or tub of water, where the water is deeper than the pot, and allow it to stand until the air bubbles cease to come to the surface ; then, in taking the pot out, drain the water from the top of the pot so that as little water as possible will pass through the soil. The reason that this method is better than the one usually employed is that the earth in drying shrinks away from the pot, and when the water is poured in at the top it is very apt to find its way down the sides of the pot and out at the bottom, without having thoroughly penetrated the centre. You will also find that plants watered by this method do not dry so quickly, thus showing that the watering was more thoroughly done. And now I must sound a note of warning in regard to jardinieres : they are all very well in their place, and certainly improve the appearance of a handsome palm, but they were never intended to water palms in. When you water your plant, take it out of the jardiniere and allow it to drain before putting it back ; and it is perhaps as well as a matter of precaution, to have an inch of beach gravel, or something of that nature, in the bottom of the jardiniere, and when you lift your plant out, drain out any water that may have accumulated.

The next matter of importance is washing the leaves. To keep a palm in good order this must be done at least once a week, and at a time when the plant needs water. Perhaps the easiest way is to stand the plant in a bath or tub and give the leaves a shower bath with the watering can, or fill up the bath and put the plant in so as to cover the leaves, if necessary, placing it on its side. Should you prefer to have the leaves cleaner than these methods will make them, rub them over with a damp sponge, rinsing it occasionally. There is no necessity to use castor oil or anything else of that nature to make the leaves glossy if they are kept perfectly clean. Handle your palms carefully. The tip of the coming leaf in some varieties is very brittle ; the slightest touch will break it, as I have found out to my sorrow more times than one. If you should be so unfortunate as to break one, don't feel too bad about it, as the injury is generally temporary, seldom affecting the leaf after opening.

With regard to temperature, a palm with proper watering will stand a higher or a lower temperature than we would find comfortable in our living rooms. It is a mistake to suppose that they require an extra amount of heat. They will grow and thrive just as well in a lower temperature, say from 55 to 65 degrees, and in the end make a better plant. A palm will stand, without injury, an occasional temperature of 45 degrees, provided it has not been grown in a high temperature, but it is not, of course, advisable to subject the plant to such an extreme if it can be avoided. As to light, give them a sunny window in winter if you can, but it is by no means a necessity ; many palms that are fine specimens have seen little or none of the winter sun. Be careful not to give a full exposure to sun in the late spring, or the result will probably be unsightly burnt leaves. If your house is heated by a hot air furnace, be sure to keep the water pan filled, as much for the benefit of yourself as your plants, and avoid if possible coal gas, though palms stand even more of this than most plants. Should your house be lighted by gas, grow your palms in the room where least of it is used. Special ventilation I do not think is necessary, the air that is pure enough for us will be all the palm requires.

There is but one class of insects that is injurious to palms. These are generally known as scale, and you will have to learn to know them and keep a sharp lookout for them, otherwise your efforts at palm culture will come to naught. They appear as little greyish or brownish scales on the leaves, and will, if left undisturbed, render the finest green leaf a sickly yellow. Should you have them in any quantity, take a tooth brush and water and scrub the leaves until the scale has fallen off. If, however, your plant is free from these pests to start with, and you examine it occasionally, you will probably never find more than half a dozen or so, which may be removed with a little piece of stick, or anything else that comes handy. Never apply kerosene emulsion or anything else of that nature to your palms ; it may kill the scale, but will certainly injure the plant.

And now, we may consider the soil and method of potting. I have grown palms with some measure of success in soils of widely varying nature; for instance, in rotted clay sod, then in leaf mould, and again in a mixture of the two, and I have found but one soil so far in which they would not grow, and that was rotted sod and manure. The lesson to be learned from this is, avoid manure in any shape for palms. Whatever soil you use, make leaf mould the basis of it. All my palms but one or two are growing in pure leaf mould, and the one or two are in leaf mould with the addition of about 25 per cent. fine beach sand. This latter soil is the better of the two; but I think the substitution of light rotted sod for the sand would be still better, provided there was no manure mixed with the sod. In case that any of you do not understand what is meant by leaf mould, I may say that it is simply thoroughly decomposed leaves, and can be found in any woods. Scrape away the rough leaves on top, and you will find your leaf mould from two to four inches in depth underneath. In using it, don't sift it or throw out the fibrous parts or little pieces of stick: let it all go into the potting soil. Another thing, do not take your leaf mould from a depression, where water might lie; select a spot that is well drained, otherwise your soil will be sour; in fact, it would be better to throw the leaf mould in a little heap, in cellar or outhouse, and turn it over a couple of times, to make sure it is perfectly sweet before using.

In potting, the first thing to be considered is drainage, and this must be perfect. To attain this end, I know of nothing equal to the method described by our President in his talk about bulbs. If you remember, he covered the hole in the pot with a piece of broken flower pot, then put in half an inch of beach gravel, and over this some moss or leaves torn to shreds. This is an improvement on any method I have used so far, and I intend to use it in future. Having provided the drainage, put in some soil, and then your plant, and remember one thing, pot tightly; take a flat stick and ram the soil down around the side of the pot; you will hardly get it too tight. Be sure the pots you use are perfectly clean, and use a pot an inch larger than the one the palm is already in. In some cases it may be desirable to put the plant back in the same pot that it is growing in. To do this take the plant out of the pot and stand it in a pail of water, washing all the earth from the roots; then put it back in the pot, and with the fingers ram the new soil in between the roots until the pot is full. This is rather a delicate operation, and I would not advise anyone to try it extensively without first experimenting, though it proved a success with me in the case of two plants last spring. The best time for an amateur to pot palms is in spring, probably the latter end of May, and one shift a year is plenty for all palms, though some of them may not require potting as often. It all depends on how the plant is growing. Learn to turn a plant out of the pot without disturbing the soil, and keep track of the condition of the roots; in health, the tips should be light in color; if black and soft, something is wrong. The trouble may be too much or too little water, the one who waters the plant is the only one who can determine which. When turning out the plant if you see a worm take it out, but it is doubtful whether they do any harm or not. Should you wish, however, to get rid of them, try watering with lime water, or stick half a dozen matches in the pot, sulphur end down, and leave them there through two or three waterings, and the worms will come to the surface.

Palms will probably be the better for staying out of doors in warm weather. Certainly they are more easily looked after, but they must not be fully exposed to either sun or wind; the sun will burn, the wind thrash and split the leaves. The ideal spot is one with the wall to the south and west; in such a position the plants get three or four hours sun in the morning, and are protected from the prevailing winds. Another good place in summer would be a sunny position, where they could be protected by cotton stretched along the sides and over the top of them. In this position they would make a more rapid growth, but would require careful watching; the slightest drying out would result in injury. In summer I have always watered my palms with the hose. There is no doubt that tepid water would be better, but the hose was so much the handier that it outweighed all other considerations. Take your plants in when the nights get cool, and put them out during the day. You can give them all the sun they can get at this time of year without fear of injury, but beware of the wind.

In recommending varieties of palms, I have confined myself to personal experience, and there are no doubt many others of which I know nothing that would do equally well in the house. There are also some other plants which cannot be classed as palms, but which are of the same decorative nature. Chief among them stands Pandanus Utilis, the screw pine, which does well in the house, but should not be subjected to as low a temperature as palms will endure, and will come a much better color if grown entirely in the shade. Pandanus Veitchii is a variegated form, green and white, but seems to run to a solid light green, and is not so desirable as the other. Ficus elastica, Cordyline indivisa, Araucaria excelsa and many greenhouse ferns make fine decorative plants, and will grow well in the house. One word, in conclusion, to those among you who may have bought palms and seen them die or become so unsightly as to be an eyesore rather than an ornament. Do not be discouraged and conclude that palms will not grow in the house, rather try and find out wherein you have gone astray, and thus get the benefit of the experience that has cost you so dear. Remember one thing, look your plants over every day. It will take but a moment or two, and you will be surprised to find how their needs vary with the varying conditions surrounding them. That palms can be grown in ordinary living rooms as well as in greenhouses I know to be a fact. I venture to state that I can find many palms that have not been in a greenhouse in years, that, size for size, will hold their own with any plants grown under glass.

DECIDUOUS SHRUBS.

By Roderick Cameron, Niagara Falls.

I have often considered the want of a reliable list of the best, most floriferous, useful and hardy deciduous shrubs a great drawback to the general planter of such stock; hence my reason for compiling this list, trusting it may serve a good purpose. It will certainly save busy people from turning up hundreds of varieties in the different catalogues and journals when if not familiar with the varieties, they are very apt to be led astray by the glowing descriptions given, and those unfamiliar with shrubs are apt to be confused with their great number, so many of them being so alike in appearance. Another mistake too often made in catalogues is their silence as to the hardiness of plants, and the silence of our journals in not condemning such, so saving the unwary from spending their money in useless stock. Farmers are generally ridiculed for not planting trees, shrubs and hardy plants about their houses; they are not all bred gardeners, why then not tell them the varieties to plant? Why not give good prizes at our large exhibitions for collections of such stock, and have them named? I think that a prize offered by the government for the best named collection of trees, shrubs and herbaceous flowering plants would be of untold value to the country by educating the farmer and the mechanic as to what to plant. I hope the following list will be found to fill the bill, and as to the names there is nothing here mentioned that will not do well in Welland or Lincoln counties.

1. *Berberis Thunbergii.* From Japan, about 3 feet high, one of the best dwarf shrubs in cultivation; flowers yellow, in drooping racemes followed by red berries in the fall and continuing well through the winter; no collection should be without the Japanese berberry.

2. *Berberis var. purpurea.* A purple-leaved variety of our native Berberis vulgaris; will grow to 8 feet high and is a beautiful object as a specimen plant on the lawn or as a hedge plant; a hedge of this plant looks well throughout the summer, and well into the winter after the leaves fall, with its quantities of berries, particularly if planted on poor sandy soil. The fruit is much prized by the partridges, and is equal if not better than cranberries to eat with turkey at Christmas if canned before getting frozen. My experience is that the purple variety does not fruit as freely as the native variety B. vulgaris.

3. *Caryopteris mastacanthus,* or Verbena Shrub. About 3 feet high, blooms from September until cut down by frost. This shrub is a grand acquisition; it is one of the prettiest flowering shrubs that I know of, the flowers resemble heliotrope; it blooms in the axils of the leaves and all along the stem; the leaves are very pretty light green above and very silvery on the under side; the whole plant has a beautiful odor. If this plant proves to be hardy, there is no plant will give as much pleasure; there are two colors, blue and white.

ELEAGNUS LONGIPES.

4. *Chionanthus Virginica* (White Fringe). This will grow from 5 to 8 feet high in rich deep soil ; is also a hardy gem, producing racemes of white fringe-like flowers about the first of June, followed by purple clusters of fruit, like grapes in the fall.

5. *Corylus var. purpurea*—(Purple-leaved hazel). This plant is by all odds the best purple foliage plant for general purposes we have and very hardy ; it is very showy at a distance. It will grow to 10 feet high, but can be kept dwarf by trimming.

6. *Daphne mesereum* (*rubrum* and *album*). This should be in our collection of shrubs from the fact that they are the earliest flowering shrubs that we have, and of very sweet perfume. This plant is a native of Niagara Falls and is very hardy ; flowers before leafing out ; it grows to a height of 5 feet.

EXOCHORDA GRANDIFLORA.

7. *Deutzia crenata*, single white. Will grow to 7 feet high : all the deutzias are beautiful shrubs, and we cannot afford to leave all of them out of the list.

8. *D. crenata flore pleno.* Double pink flowers in racemes in the month of June, 8 feet high.

9. *D.* (Pride of Rochester). Double white tinged with pink, a very beautiful variety, but I think it a little tenderer than the last. This one is useful for florists' work, to cut from.

10. *D. gracilis.* This one is of a dwarf bushy habit, very hardy, pure white, single flowers in racemes completely covering the plant, good to force in the greenhouse, also good to cut for florists' work, will flower in May ; about 4 feet high ; will flower at Easter when forced.

11. *Eleagnus longipes.* Silver thorn of which there are several varieties ; this one has the most beautiful foliage of a greenish white above and a silvery white on the under side, which shines in the sun.

12. *Eleagnus umbellata.* The female plants of this variety are a grand sight to see when in fruit, the leaves are silvery white like the rest of its class ; the fruit is eatable, of a reddish

amber color about like currants in size ; flowers small and yellowish, not showy. Plants can be kept down by trimming to 7 or 8 feet in height.

13. *Euonymus Europoeus* (European strawberry tree). This shrub will grow to about 10 feet in height ; should be kept as a single specimen plant, which makes it more attractive when bare of leaves in the fall ; about the first frosts the seed pods begin to open, exhibiting their strawberry-colored seeds which remain on the plants all winter, making them pretty objects standing among the snow ; flowers small, chocolate color.

14. *Exochorda grandiflora.* From China, hardy here, a most beautiful shrub, bearing white flowers in clusters, very showy, about 6 feet high—one of the best.

15. *Forsythia Fortunei*, var. *suspensa*, and var. *viridissima* (Golden Bells). From China ; the three varieties are hardy here, in bloom end of April or first of May ; a grand shrub covered with bright golden bells before leafing out ; blooms here the second time in the fall.

16. *Halesia diptera*, and *H. tetraptera* (Silver Bells). This plant becomes a mass of white bell-like flowers, will grow to small-sized trees, 10 or 12 feet high ; there is no plant prettier when in bloom about the middle of May ; blooms before the leaves expand ; belongs to Southern States.

17. *Hibiscus syriacus—Althæa* (Rose of Sharon). It will grow to 10 feet high ; extremely useful on account of their late flowering ; they bloom profusely at a season of the year when but few shrubs are in bloom, 1st August. There are double and single flowering varieties. The following will be found as good as any .—H. var. Carnation, double white striped red ; H. var. Cœrula, double blue ; H. var. Lady Stanley, double white, tinged pink ; H. var. Variegatus, leaves beautifully variegated.

MOCK ORANGE.

18. *Hydrangea paniculata grandiflora*, grows from 5 to 6 feet, but should be kept cut back to within 4 or 6 inches of the old stem or trunk each spring, and only leave four or five of these short stems to have large panicles of bloom ; a long-lived healthy plant, blooming in August and September ; from Japan.

19. *Hypericum Moserianum* (St. John's Wort). Grows to about 3 feet in height, a very desirable hardy shrub, producing yellow flowers 2 inches across from July to fall ; native of America.

20. *Ilex. Verticillatus* (Deciduous Holly). 5 to 6 feet high. I met with a plot of these shrubs lately in our own woods, and I thought them one of the most beautiful sights I had seen for a long time, the plants were literally covered with bright

red berries, the ground being covered with snow make them look all the brighter ; they last all winter ; flowers small, white in July.

21. *Ligustrum, var. tricolor* (Privet). This variety I would recommend on account of its beautiful variegated foliage, a very pretty sport of the common Privet.

22. *Lonicera* (Bush Honeysuckle). Turkestan. L. var. candida, 8 to 10 feet, white flowers in end of May.

23. *L. var. fragrantissima.* This a Chinese variety, greatly admired for its very sweet-scented pinkish white flowers which appear early in spring.

24. *L. var. grandiflora* is probably one of the best of all, much larger pink flowers than the type, blooms in May.

25. *Paeonia Moutan* (Tree Paeony). 3 to 4 feet high ; slow growing, but when matured will agreeably surprise the owner by the large rosy pink double flowers it produces in profusion ; requires rich soil.

26. *Philadelphus* (Mock orange). Southern United States. Philadelphus grandiflorus is one of the best, 10 feet.

27. *Philadelphus var. aurea.* Is a golden leaved variety of the preceding one, and of a dwarfer habit, good.

28. *Prunus Pissardi.* 8 to 10 feet, a grand purple-leaved large shrub or small tree, retains its color until the fall, a valuable plant for color.

29. *Pyrus Japonica* (Cydonia Japonica). Japanese Quince, or Burning Bush, too well known to need description, 5 or 6 feet high.

30. *Rhus cotinus* (Mist or Smoke Tree). 8 to 10 feet, bears large panicles of mist-like flowers in June from which it derives its name, native of United States.

31. *Sambucus* (Elder) var. *aurea.* A golden leaved variety of the common elder, a showy plant for color effects ; 6 feet high.

32. *Spiraea.* The spiraeas are very desirable shrubs in all shades of color, double and single flowers. They grow from 2 to 6 feet high ; there are about 49 varieties that I am acquainted with. The following are about the best :

33. *S. bumalda.* 2 to 3 feet, one of the best of the newer sorts, flat heads of rosy pink flowers.

34. *S. Anthony Waterer,* 2 to 3 feet, a continuous bloomer all summer ; a sport of the preceding one, crimson flowers.

35. *S. callosa.* 3 feet, pink flowers, and continues in bloom a long time, hence its value.

36. *S. callosa variety.* A white variety the same as the preceding one.

37. *S. prunifolia* (Bridal Wreath). Too well known to need description ; 5 feet high, double white flower.

38. *S. Reevesii*, var. flore pleno. 3 to 4 feet high ; a very beautiful variety bearing double white flowers about the size of daisies, one of the best ; in bloom about first of June.

39. *S. Thunbergii.* 4 feet ; this one has single white flowers in two to four all along the young wood and preceding the leaves, very pretty ; in flower about the first of May.

40. *S. Van Houttei.* This one when in bloom would mind one of banks of snow ; a grand variety ; also makes a pretty hedge, 4 feet high.

41. *Symphoricarpus.* (Snowberry) var. vulgaris. This one bears red berries ; very pretty in the fall.

42. *S. racemosus.* Bears white berries, otherwise like the preceding one, both are nice planted together.

43. *Syringa* or lilac. The lilacs are too well known to make any comment upon them, suffice it to give the names of a few of the best, and will begin with the Persian varieties, which are dwarf, growing to about 8 feet high ; they have small leaves and are profuse bloomers ; *Syringa Persica* (Persian lilac) flowers light purple.

44. *S. persica var. alba.* The white form of the preceding ; both are good to plant among some of the larger varieties.

45. *S. vulgaris.* This is the common garden lilac, 10 feet high, purple flowers.

46. *S. alba.* A white form of the above. Both are as reliable as any of the newer ones, of which there are a great number.

47. *S. var. Comte Horace de Choiseul.* Reddish lilac, and double flowers.

48. *S. Charles the 10th.* 7 feet, very good purple.

49. *S. vulgaris Marie Legrange.* 4 feet, a dwarf form, with large white panicles, very good.

50. *Tamarix Africana.* Grows to 8 feet high has small pink flowers, in slender racemes, which appear towards the end of May or the first of June ; the foliage is small and heath-like ; makes a good green for bouquets.

51. *Tamarix Indica.* 6 feet high ; blooms at the end of August or first of September, of a brighter rose color than the above variety, A few plants planted together of the tamarisk makes a fine display of which the bees are very fond.

52. *Viburnum Plicatum.* 6 to 7 feet, Japanese snow ball ; this is one of the best shrubs in cultivation.

53. *Weigelia or Diervilla.* (var. rosea). One of the best, and flowers the second time in the fall.

54. *Weigelia candida.* Pure white variety of the above.

55. *Weigelia Desboisii.* Dark rose color.

56. *Weigelia variegata.* A variagated-leaved sort, all are grand shrubs for any lawn, grows to 7 feet high.

AFRICAN TAMARISK.

HARDY PERENNIAL PLANTS OF THE BEST AND MOST USEFUL VARIETIES FOR ALL PURPOSES.

BY RODERICK CAMERON, NIAGARA FALLS.

My intention for making up this list is that any person may choose varieties suitable in height, color of bloom, etc., to suit any situation, large or small. All of the journals and catalogues of perennials are very confusing to the inexperienced lovers of these beautiful flowers. It has been well said that the earth wears a crown of floral beauty, and among the brightest, richest, and sweetest are the hardy perennials ; they fill a place in our gardens and in our hearts which nothing else can supply ; like flowering shrubs when once planted they are a thing of beauty for a life time. What is more cheerful or more beautiful than the clumps of Phlox, Lilies, Irises or Pæonies that our fathers, mothers or perhaps our grandmothers planted. If people owning their own homes would only buy of the following assorted varieties of perennials, in place of wasting their money year after year in annuals, the same money that is spent in these flowers that only last a season and are gone, would, if put to the buying of the following perennials, secure this full collection in a few years, and, if properly planted, would be an everlasting beauty to any home and the community in which they were planted. A list of this sort by some person familiar with the best of our hardy perennials, hardiest and best shrubs, and most decorative trees, and I may add our fruiting trees, has been a long felt want. What do we find? In all our journals there are hundreds of varieties of perennials, shrubs and fruiting trees that are of no value, some have never been of any value. Our fruit catalogues seem to be vieing with each other as to which can supply the greatest number of names,such lists particularly in fruits has been to a great extent very detrimental to the well being of the most of our orchardists, and we can see the bad effects of these lists in our orchards all over the Province. The beauty of a good collection of perennials is unexcelled by any other flowers; they have cheered many persons through dark hours of life; they were loved and planted by dear ones whose voices and presence are no more; their blooming calls to our minds happy days and faces that are gone not to return. There are many cheerless looking homes in our rural districts that could be made ideal abodes, with very little money, by judicious planting of the commonest of herbaceous plants and shrubs from the woods, if the few dollars could not be spared to buy of the list named below. Let us plant of these old friends of our forefathers, that I am glad to say are fast becoming great favorites with the flower-loving people of the world. There cannot be mistakes made in selecting from the following list, as every one of those mentioned is first class, chosen from among hundreds of varieties.

Achillea ptermica flore pleno. Double sneezewort (northern hemisphere), height, one foot; in bloom all summer; flowers small, white and double.

Anthemis tinctoria. Kelway's hardy golden Marguerite (Europe), height, eighteen inches; blooms in end of June; flowers large yellow.

Aquilegia or Columbines. There are many of these in cultivation in every shade of color, and in doubles and singles, short and long spurred; there is also the well known native variety Canadensis. They range from eighteen inches to three feet in height, and are indispensable for the hardy border, ranging in bloom from June to September.

Aster amellus. (From Russia), height, eighteen inches; blooms from July to fall; flowers large and purple; very good for cut flowers.

Chrysanthemum uliginosum (Pyrethrum). Showy white flowers two inches across, four feet high, in bloom August to September, fine to cut.

Coreopsis lanceolata and *Grandiflora.* Leaved tick seed (United States), height, two feet; flowers large yellow; in bloom all summer if the seed pods are kept off.

Delphiniums or Larkspurs. There are many shades of color and varieties of this most beautiful and useful plant. No garden should be without some of them; they vary in height from two to six feet.

Doronticum Caucasicum. Caucasian Leopard's bane (Europe). Height, one foot; in bloom in May and June; a grand early perennial; flowers large yellow.

Gaillardia grandiflora, or Blanket Flower. (North America), height, eighteen inches; flowers large violet blue and yellow, they can be had in several varieties, flowers good to cut; very desirable plants.

Gypsophilea paniculata. Infants Breath, (Europe). Height, eighteen inches; in bloom July and August; it bears myriads of small white single flowers, if cut and dried will last for a long time, good for bouquets.

Helenium grandicephalum striatum. Flowers striped, yellow and white variety. *Autumnalis* is a native of Canada, the same height as above variety, two feet. Variety grandiflora grows to the height of six feet; the last two named varieties have yellow single flowers in the greatest abundance; the three are good border plants and good to cut for large bouquets.

Helianthus multiflorus flore pleno. (Dahlia Sunflower). Native of United States; height four feet; blooms in August; flowers large yellow and double, a very useful perennial.

Heuchera sanguinea. Alum root. Native ot Mexico; height, eighteen inches; blooms in June; flowers scarlet, very showy and useful to cut. This is one of the brightest perennials in cultivation. There is also a white variety.

Hemerocalis Dumortieri. Japan day lily; height, two feet; a gem for the border or for cutting; soft rich yellow, exterior bronzy yellow or orange.

Hemerocalis flava. Golden yellow, fragrant day lily, (Europe), good for cutting, about three feet high, one of the best.

Hemerocalis Thunbergii. Bright yellow, three feet high; very fragrant; as this one blooms long after all the other day lilies have finished, it adds much to its value as a cut flower. There are two double varieties, and one variegated foliage; all are worthy of trial in the herbaceous border, (Europe).

Hibiscus Moscheutos. (Ontario Rose Mallow) height, three feet; blooms in August. The hybrids called Crimson-eye are magnificent plants; flowers nine inches in diameter, white with large crimson eye, and all pink in others; from two to five feet high; August and September, very fine.

Iberis sempervirens. Evergreen candytuft, (Candia), height, one foot; in bloom in June; white, a little fragrant in large clusters and flat, good to cut.

Iris germanica. German Iris, (Europe), height, two to three feet; there are many shades of color in the Iris; they are large, showy, very desirable plants.

Iris Kaempferi. Japanese Iris (Japan), height, two to three feet; the flowers of this iris are equal to the most beautiful orchids in many colors and varieties.

Lilium auratum. (Japan), height, four feet; blooms in July, is better of some protection in the winter, this is a very large and the most beautiful of all the colored lilies.

Lilium speciosum. Var. rubrum and var. album, are hardier than the above and are very fine lilies, bloom in August. (Japan).

Lilium longiflorum. A grand long. white, bell-flowered lily, increases fast, one of the best; height two feet.

Lilium candidum. (Japan), pure white; height three feet; very hardy and free blooming variety, grand to cut, all perfumed.

Lychnis splendens. Double Red, London pride, (Europe).

Lychnis semperflore. Pink, small flowers in abundance.

Lychnis vespertina. Double white; about two feet high; the above three varieties are the pink of perfection of what a perennial should be; grand to cut.

Paeonia officinalis. (Europe), height, three feet; I have about sixty varieties of the pæonia growing in all shades of color, in bloom June and July; one of the best border plants, grand to cut, very showy, requires deep rich loam soil.

Papaver nudicaule. Iceland poppy, (northern hemisphere), eighteen inches; color orange yellow and white; double and single, bloom in June. The Oriental variety is very beautiful, nine inches in diameter, scarlet with black eye, grand if planted in deep rich damp soil (Asia); three feet high.

Phlox decussata. Hybrid perpetual phlox (United States), height, three to four feet; in many colors, grand perennials, in bloom July and August.

Platicodon grandiflorum. (Chinese Campanula), China and Japan, height, two feet; in bloom July and August; there is a white variety, alba, also double; both are first class perennials.

Pyrethrum uliginosum. Sometimes called chrysanthemum uliginosum. Great Ox-eye, (Russia), height, four feet; in bloom August and September, makes a grand display, white.

Rudbeckia laciniata. Golden Glow, (United States), height, six to eight feet; blooms in August and September; flowers yellow, double and in great abundance, a grand plant for the back of the border and for cutting.

Spiræa. There is a number of varieties of the herbaceous spireas, and there are no plants more beautiful when in bloom, grand to cut for any purpose; there should be more of these plants used when they become better known; the following are probably the best: *Spiræa aruncus*—Three to four feet long, feathery panicles of white flowers, a grand variety. *Spiræa astilboides*—This one is also a grand perennial, a good bloomer; height, three feet; feathery white flowers, useful for forcing. *Spiræa astilboides floribunda*—A superb variety, dwarfer and blooms white. *Spiræa chinensis*—"Astilbe" (China), a grand aquisition for the border, a robust grower; three feet high; white triangular plumes, tinted with pink, excellent. *Spiræa Japonica*—Good for the border or for pots to force; two feet; white. *Spiræa Japonica aurea reticulata*—A variegated form of the ordinary variety, green leaved, veined with yellow, very pretty; two feet; white flowers. *Spiræa compacta multiflora*—A splendid variety for pots and the border; immense white plumes, robust grower; three feet. *Spiræa filipendula plena*—A beautiful double-flowering variety, very neat fern-like foliage, one of the best and neatest of this class; eighteen inches. There is also a single flowering variety of the last. *Spiræa palmata*—(The Crimson Meadow Sweet) Flowers crimson, very showy large panicles; three to four feet; one of the best. *Spiræa palmata alba*—A snow white variety, very fine; three feet. *Spiræa palmata elegans*—This variety has pale rose-colored flowers, very fine; three to four feet; one of the best.

NOTE.—All the above are deserving of cultivation; they are very easily grown and grand to cut for bouquets; most of them were raised in Europe.

Statice latifolia. Sea lavender, (Bulgaria) fifteen inches; good to cut, will last a long time if dried; blue; very fine herbaceous plant.

Yucca filamentosa. Adam's Needle, this variety is hardy, and flowers beautifully in the counties of Welland and Lincoln. They are imposing objects, they grow from six to seven feet high when in bloom; flowers white, lily like.

Lythrum Salicaria. (Spiked Loosestrife). Niagara Falls native plant, very good perennial; three feet high; blooms all summer, flowers reddish purple

Anemone Japonica—or Wind Flower. Height three feet, (Japan). There is a number of varieties of this beautiful late flowering plant, but this one which is white and its sister variety rubra, red, is the best for common cultivation; flowers in September and until cut down by frost: the red one is only two feet high.

Chelone coccinea. A charming plant; two feet; red flower; very showy, good to cut.

THE HARDY PERENNIAL BORDER.

BY A. ALEXANDER, HAMILTON.

The subject of hardy herbaceous plants and their use in the ornamentation of private grounds and public parks has received a good deal of attention during the past few years, and the numbers of new species and varieties of these plants suitable for the hardy perennial border are being multiplied at a rapid rate.

The earliest and sunniest recollections I have in connection with flowers, hover over the borders and beds of my childhood home, which were filled exclusively with old-fashioned perennials. There were lilies stately and tall in large groups, great masses of Sweet William, primulas in endless variety, scarlet lychnis, saxifraga, phlox, pæonies, hollyhocks and lots of others too numerous to mention. These were all interesting as they one by one opened their blossoms in the floral procession, but to me there was and is still in the yearly miracle of their re-awakening, in watching the tips piercing the soil, in their varied modes of unfolding thei first leaves with such a variety of colour too, from the tenderest green to deep crimson, an added pleasure not derived from ordinary bedding plants. I consider this a strong argument in favour of the cultivation of these hardy flowers that they afford so much joy in watching their yearly appearance as soon as the icy grasp of winter is relaxed.

While I do not say that hardy perennials will ever take the place of ordinary bedding plants for the decoration of public or private parks or grounds, or can be used so as to secure the striking colour effects secured by the geranium or coleus and others, still I assert that any one possessed only of a small garden or whose acres are filled with beautiful flowers of the hardy sort, can have from early spring to autumn frosts, a continuous succession of bloom.

We can have them suited to every situation, sunshine or shade, and to nearly every kind of soil. Not only so, but when once established in our gardens they stay with us forever if we are fairly good to them, increasing in bulk and beauty from year to to year. We have them gay as the oriental poppy, and showy as the pæonies; while many of them are excellent as cut flowers, as the single and double flowering pyrethrums, so many beautiful hybrids of which are being introduced. Need I name the Iris family with its varied classes all exquisitely beautiful; the aquilegias in infinite variety, from our own native variety to the Rocky Mountain one with its heavenly blue and immaculate white, so blue and so white, as if it had been painted when gazing into the azure from its Rocky Mountain home; the campanulas, all dainty and general favorites; the larkspurs too, giving us color and stately growth from pure white through every gradation of color from blue to red. Many of these hardy plants are very fragrant, such as the sweet valerian and many others quite as hardy.

WHITE CAMPANULA, IN MR. ALEXANDER'S GARDEN.

DICENTRA CANADENSE, AT MR. ALEXANDER'S.

I have no intention of wearying you with lists of names of these hardy plants. The best and most useful list that I have seen is that issued by the Experimental Farm at Ottawa, consisting of 100 varieties and compiled by Mr. Macoun, the horticulturist there in 1897.

Just a word about the border itself. Hardy perennials I find thrive best in good ground with lots of rotted leaves worked into it. The thrift of the plants in such soil is so marked as to well warrant them getting it.

These plants, many of them at least, increase so fast and spread so much that they require to be lifted, divided and replanted every three or four years. Some of them, such as the perennial phlox, so exhaust the soil in their immediate neighborhood that they are better if their position is changed every two years. The pæonies and some others are better not to be moved. Every fourth year I trench my perennial borders. I proceed as follows. I take out a trench two spades deep and two spades wide, wheeling the soil to the other end where the operation will finish. I then mark off another space equal in width to the trench made and with my spade I take off about two inches of the top soil and throw it into the bottom of the trench; on this I put a good coating of fresh manure, tree leaves or the product of a rubbish heap of vegetable matter of any kind, then I throw upon this a spade deep of the earth from the second trench, on the top of this I spread some well rotted manure or humus of any kind, then on this I throw up another spade deep of the soil left in the trench; when this is done we have a second trench, the same depth and width as the first, and so I proceed until I reach the end of the border, where I find the earth taken out of the first trench to fill up the last with, its two layers of manure or other enriching material sandwiched twice. You will see that this really means the turning upside down of the whole border to the depth of about 18 inches and enriched with two layers of manure, one near the bottom one and one midway up. The reason of putting the fresh and unrotted manure in the bottom and the other higher up is that the plants when replanted will find out and get the benefit of the higher layer of manure the first year, and by the time the roots get down to the lower it will be so decayed that they can appropriate it to their strengthening and beauty, and can bid defiance to hot summers and other adverse surroundings for they are feeding on unseen supplies of food and moisture.

IBERIS GILBRATIC, (CANDYTUFT.)

HARDY FLOWER BORDER, AT MR. ALEXANDER'S.

Planting is best done in the early spring. It is better to have good clumps or masses of the best of these perennials than to have

HARDY FLOWER BORDER IN GARDEN OF MR. A. ALEXANDER, HAMILTON.

little bits of everything you can lay hands on if the ground is limited in extent. I would recommend a very liberal planting of the hardy bulbs, not lilies only, but the scillas and chionodoxa, the snowdrop and crocus, and the Narcissus family should be fully represented. The scillas and the Glory of the Snow, are most satisfactory and never fail to cheer the border, for they increase and improve from year to year.

I make a liberal use of many of our native plants. What more satisfactory than the trilliums, the hepatica and the blood-root to brighten the border with their pure white and azure blossoms, and the phlox divaricata makes a fine mass of purple lasting for weeks, and many others. Many species of asters are invaluable in the fall months.

We sometimes hear the complaint that a perennial border is an unkempt and unsightly affair as compared with the trim beds filled with greenhouse plants. It is, if not cared for. Plants needing support should have it early, and all flowers that are done blooming should be removed and the soil between the plants kept stirred from time to time.

I hope to see some of the commercial horticulturists of Canada go into this business and present us with a catalogue of these hardy plants as extensive as those issued on the other side of the line. And it would be well, if the commissioners of public parks gave this matter some attention and planted borders of these perennials all labelled so that the public could see for themselves and choose for their own gardens and be instructed as well as interested. Much more might be said on this subject, but I must close. I therefore urge the more general cultivation of hardy plants. It is interesting to watch their development, because there is a touch of home in the coming of the truly hardy varieties of flowers that seems to defy all kinds of abuse and quickly respond to good care, and we watch for them as eagerly as the seasons come and go; because the first cost of them is less than the tenderer and more aristocratic bedding plants; because of the greater variety and the longer flowering period we can have each year by their use; and they are less trouble than the more tender sorts and increase from year to year.

Rocket, (Very Fragrant), Showing the effect of masses, as compared with Single Flowers, at Mr. Alexander's.

DIGITALIS PURPUREA (FOXGLOVE).

By A. Alexander, Hamilton.

> "An empty sky—a world of heather,
> Purple of Foxglove—yellow of broom."—*Jean Ingelow.*

Thus the gifted poetess quaintly but truthfully paints the moorlands in many parts of the Motherland. No tree to break the skyline—the beautiful heather everywhere, only broken here and there by patches of the yellow broom. It is there that the stately foxglove, the subject of this brief sketch, is found and seen to advantage, standing upright as a sentry on guard. in gorgeous uniform, perhaps in the shelter of a broom or gorse bush, or surrounding some huge granite boulder, sometimes gently swayed in the sweet breezes wafted over the heath, vocal with the hum of bees, and laden with the fragrance of the moorland flowers. It was in the shadow of a large rock not far from Dunsinane Hill where Macbeth's castle of historic fame stood, that I first made my acquaintance with the foxglove. Years afterward, I found the descendants of the same sentries keeping watch over the same rock, reminding one of the customs of times gone by, when certain posts of honor were hereditary in the family, handed down from father to son. It is not only on the heaths and moorlands that this most stately and beautiful of herbaceous plants is found, but in Scotland and some parts of England many a hillside, and dry, sandy bank, or moorland margin, is made gay with the large purple flowers of the Digitalis. It belongs, botanically, to the order *Scrophulariaceæ.* In Britain, its native country, it grows to the height of from two to four feet perfectly upright, bearing from 50 to 100 beautiful purple (rarely white) campanulate flowers marked inside with yellow eye-like spots.

DIGITALIS PURPUREA.

The flowers are in shape like the fingers of a glove, hence the name, and hang on one side of the stem. It is found distributed very widely in Britain from Lands End to the Orkney Islands, and also in Western and Central Europe, where there are also found two other species: *D. lutea* and *D. grandiflora.*

The digitalis had from early times a great reputation as a medical plant, being applied externally to ulcers and scrofulous tumours, and taken internally for diseases of the heart and for dropsy. For these purposes the leaves are used, being gathered when the plant is in bloom. It thrives best in a gravelly or sandy soil. The common name is from the Anglo-Saxon foxes-clife or foxes' glove. It is known by a great variety of names in Britain. In the south of Scotland it is called "Bloody Fingers," further north "Deadman's Bells," and on the eastern borders "Ladies' Thimbles," "Wild Mercury," and "Scotch Mercury." In Wales the synonyms are "Elve's Gloves," "Foxes' Gloves," "Red Fingers," and "Dogs' Fingers."

The German name of Thimble suggests to the botanist Fuchs, in 1542, the Latin adjective digitalis as a designation for the plant, which it has retained ever since. The earliest known description of the plant is that by the botanist just named about the middle of the sixteenth century, though it is certain that it was known to herbalists at a much remoter period, for it is mentioned in two distinct MSS. written before the Norman Century.

However, I must remember that my purpose in writing this article was not so much to give the history of the foxglove as to call attention to its usefulness in the herbaceous border of our grounds, or as a foreground of a shrubbery or margin of a lawn. It will thrive in odd corners. Its own dignified bearing, when in flower, seems to be communicated to all around it. I have grown it for many years in great abundance and in great luxuriance, for it seems to like the sandy soil of my garden. It comes up everywhere. The illustration will give some idea of how they grow when self sown. This is from a photograph of part of a patch of fox-glove which came up where some odd seed stems had been thrown down. In a wild state, in their native land, we seldom find more than two or three flower stems to one plant, but as I grow them, I have sometimes as many as eighteen or twenty with from 100 to 125 flowers on each were cut from this plant. I find that a cedar or spruce hedge forms a fine background to show them to good advantage. They seem to like a partial shade, at least, so as to be spared the glare of the midday sun in this climate. They require no care and no protection in the winter with me. I can see the seedlings by the tens of thousands now in my garden coming up around the old plants. Through the agency of the bees I have every conceivable shade of color from the purest white to the crimson-purple. Seed sown late in the fall or very early in the spring will flower the following summer in June or July. The seed is very fine and evidently needs no covering but a little shade. The seed is produced in great quantities. I made a calculation about a year ago of how many seeds one plant of digitalis produced by counting the seeds in one capsule or seed vessel. I found it contained 250, a second one 310 seeds. Taking the average number of capsules on each flower stem of fifteen to be one hundred, there would be at least 375,000 seeds produced by one plant, a wonderful illustration of the generous provision made by nature for the propagation and continuance of her "Earthborn Blossoms."

All I need add to this already too lengthy and discursive article, is to say, that in moving the plants from one place to another, say from the seed patch, as much earth as possible should be retained about the roots.

LILACS AT THE CENTRAL EXPERIMENTAL FARM.

By Dr. Wm. Saunders, C. E. F., Ottawa.

The lilacs or syringas are among the most valued of all shrubs for the garden. They are favorites everywhere and almost universally grown. Their hardiness commends them, for they thrive not only in Eastern Canada but many of them endure the colder winters of the North-

West plains without injury. They are easily grown and the beauty and fragrance of their flowers, so freely produced in the early spring, and the richness of their foliage throughout the season, are qualities which make the lilacs deservedly popular.

This useful group of ornamental shrubs contains about ten species, seven or eight of which, with many splendid varieties which have been produced from some of them, are now more or less generally available for the decoration of our gardens.

The common lilac, *Syringa vulgaris*, was introduced to cultivation in 1597 and has, hence, been an object of admiration among lovers of flowers for more than 300 years. It is a native of Persia and Hungary, and when planted in good soil grows to a height of 10 to 15 and sometimes 20 feet. Although it suckers freely, if the suckers are persistently cut away it may be trained to a handsome tree-like form.

Lilacs may be propagated from suckers, also by budding. They are sometimes grafted on the privet, but this stock is undesirable on account of its tenderness and lack of vigour. Of late years many of the best varieties have been grown from cuttings which, when placed under suitable conditions, are said to root without much difficulty. Lilacs on their own roots are much to be preferred since when grafted on the common stock the suckers thrown up from the roots are sometimes so numerous and vigorous as to crowd out or weaken the graft.

SYRINGA VULGARIS, CHAS. XTH.

Among the earliest recorded varieties of the common lilac is the single white form *S. vulgaris alba*, and a reddish known as *rubra major* or *Syringa de Marley*. The first of the double forms, which are now so numerous and popular, was brought out in 1870, and since then most of the very best sorts now so much admired have been produced.

More than fifty varieties of *Syringa vulgaris* are included in the collection at the Central Experimental Farm embracing all the newest and finest sorts. As yet only a few of these have bloomed, and every season reveals new attractions in this wonderfully interesting group. Among those which have bloomed are some superb varieties, a few of which will be referred to. The illustrations given are all from specimens grown at the Central Farm.

S. v. Charles 10th. A specimen bush of this fine sort is shown above. This is one of the freest bloomers of all the varieties thus far tested; the flowers are of a rich reddish purple hue, are highly fragrant and are most freely produced in large trusses. A bush of this sort when in full bloom becomes a striking and most interesting object. This variety has been thoroughly tested in the most exposed situations and is thoroughly hardy.

S. v. Emile Lemoine. In this form the flowers are of a reddish lilac, very full and double, a handsome and valuable sort and a free bloomer; one of the best.

S. v. Frau Damman. This is a pure white single lilac of great beauty. The flowers are produced in large trusses which are loose and graceful. The bush is also a very free bloomer· A single cluster of bloom is shown on next page.

S. v. Alphonse Lavelle. A flower truss of this variety is shown on page 181. It is a very handsome form, the flowers are of a beautiful bluish violet color and are produced in abundance in very large panicles.

S. v. President Carnot. This is an excellent sort which produces fine trusses of large single reddish lilac flowers, clusters of this variety are shown in the illustration.

S. VULGARIS PRESIDENT CARNOT.

S. v. Madame Abel Chateau. This is perhaps the finest of all the flowers yet produced at Ottawa in this wonderful group of lilacs. The panicles are large and the individual flowers of unusual size, of a pure white, very double and of great substance. It is also a free bloomer.

Syringa Josikea, Josika's Lilac. This is a robust growing species, a native of Hungary, which was introduced into cultivation in 1588 and is now very widely distributed. Its leaves are large, glossy and of great substance, of a deep green color above and paler below. This shrub is well worth growing forits foliage alone. The flowers, which appear from ten days to a fortnight later than *Syringa vulgaris*, are of a bluish purple, the clusters are smaller than those of the common lilac, they also lack perfume. When well established, this variety blooms very freely and attains a height of from 6 to 10 feet. It makes a beautiful hedge, its rigid habit and glossy laurel-like leaves produce a fine effect., For this purpose young plants should be chosen and put out in a single row about 15 inches apart.

Syringa Persica, Persian Lilac. This species is a native of Persia and was introduced in 1640. It is a shrub smaller in size and less robust in habit than most of the other species, growing usually from four to six feet in height. The flowers, which are borne freely in good sized clusters, are bluish purple ; another variety of the Persian lilac produces white flowers ; both these forms are common in cultivation. This species is not quite so hardy as most of the other lilacs. A cut leaved from *S. P. laciniata* has also been produced.

S. VULGARIS FRAU DAMMAN.

Syringa Chinensis known also under the name of *S. Rothamgensis* or Rouen lilac. This is a very desirable shrub, well known and much appreciated. It was introduced into cultivation in 1795, and is said to be a hybrid between *S. vulgaris* and *S. persica* which was raised at Rouen by Mr. Varin then director of the botanic garden there. This variety is loose and graceful in habit, the foliage is intermediate in size and form between the common lilac and the Persian, the flowers which are of an intense purplish violet color are borne in large clusters produced in abundance.

A form of *S. Chinensis* is also in cultivation known a *S. C. Saugeana*, the flowers of which are of a reddish purple color.

Syringa Emodi—From Mount Emodus in the Himalaya mountains. This species was introduced to cultivation in 1840, and is quite distinct in its character. It grows to a height of about six feet, and is somewhat rigid in form. The leaves are considerably larger than those of the common lilac, with the underside more prominently veined, and the flowers, which are purplish or white, are arranged in longer and looser panicles. A form of Emodi with variegated leaves has been introduced, which is quite attractive. Both of these have been found less hardy than the common lilac at Ottawa.

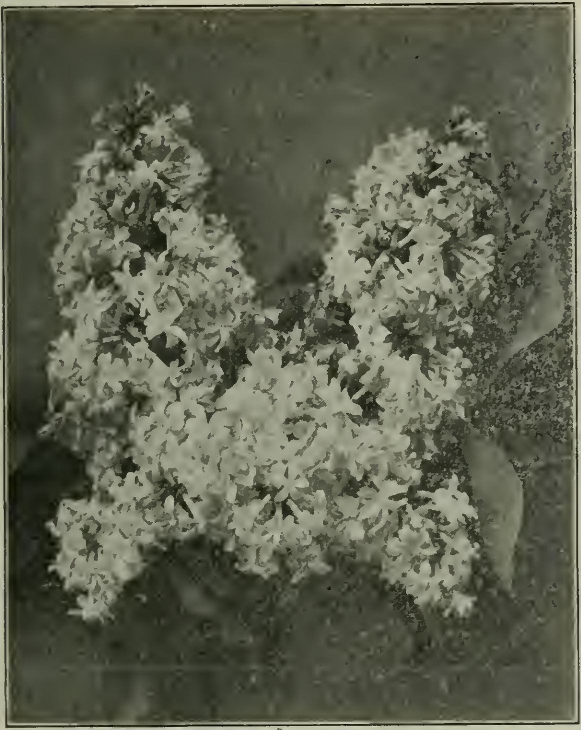
Syringa villosa, is a native of the northern parts of China of quite recent introduction, having first been brought into notice in 1880. It is lower growing than many of the other sorts of lilac, varying in height from three to six feet. The leaves are of medium size, ovate in form and rather obtuse, the flowers are of an attractive shade of pale bluish-rose, less fragrant than those of the common lilac. This shrub is a free bloomer, but the flower clusters are not so large as in some of the other varieties. Its time of blooming is about two weeks later than the common lilac, it has been tested for four or five years at Ottawa and found to be perfectly hardy.

Syringa oblata. This handsome variety has not yet found its way into very general cultivation. It is a native of China and was introduced in 1859. The leaves are large and wide, oblate or heart-shaped, and rather thick and fleshy. The flowers are purple, larger than those of the common lilac, and produced in large and handsome clusters, which are very attractive.

In its habit of growth this species much resembles the common lilac. There is a form of *oblata* which produces white flowers. The purple variety has been tested for several years at the Central Farm at Ottawa, and has been found quite hardy.

Syringa Amurensis is a native of Manchuria, China and Japan, and is common in the valley of the Amour. It was introduced in 1863. The shrub has a somewhat spreading habit and a graceful form, and grows to a height of from six to eight feet. The flowers are small, creamy-white, and produced in panicles of varied form, some being short and compact, others long and sparsely flowered. It usually blooms during the third week in June. This is a hardy and desirable species.

Syringa Japonica. This is a native of Japan and was introduced to cultivation in 1885. It is the latest in blooming of all the lilacs and does not usually flower in Ottawa until the first week in July. The flowers are small, creamy-white, and are produced in large dense clusters. They have a fragrance quite distinct from the ordinary lilac, reminding one of the hawthorne or the privet. The leaves are large and of a dark green color. This species grows taller than *Syringa vulgaris* and forms an attractive tree-like specimen.



S. VULGARIS ALPHONSE LAVALLE.

With a judicious selection of the species, and varieties referred to, one may have a succession of lilacs in bloom for from four to five weeks.

PAEONIES AT THE CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

BY DR WM. SAUNDERS, DIRECTOR.

The paeony which is said to derive its name from Pæon, a Greek physician, who first employed the plant medicinally, may be conveniently divided into two groups, the herbaceous paeony and the tree paeony. The herbaceous paeonies have tuberous roots something like those of the dahlia which send up stout flower stems every year, which at the close of the season die down. The new growth the following spring is made from strong buds or crowns which form on the tubers. These herbaceous species have been derived mainly from two wild forms, one a native of Switzerland, *Paeonia officinalis*, which is said to have been in cultivation for more than three centuries, the other a Siberian species, *Paeonia albiflora*, which was first introduced in 1734. The shrubby forms of the paeony known also as the tree paeony have been derived from an Asiatic species known to botanists as *Paeonia moutan.* The tree paeony is much grown in Japan, China, and in the milder climates in Europe. In Eastern Canada it is more or less tender and unless well protected is liable to be killed to the ground during the winter, and even where protection is afforded during the severe weather, the tender shoots sometimes suffer injury from spring frosts. Where the tree paeony can be successfully grown it is a very desirable shrub; it blooms earlier than the herbaceous species and the individual flowers are wonderfully large and fine. About 20 varieties of the tree paeony have been tested at the Central Experimental Farm, but none of them have been found entirely hardy.

Bed of Paeonies at C. E. F., Ottawa.

When the snow comes early and covers the ground well during the winter they pass through this trying period without much injury, but in seasons where the snow covering is insufficient they are usually killed back nearly to the ground and not unfrequently killed outright.

The herbaceous paeony, with which in this communication we are chiefly concerned is one of the hardiest and best known of all perennials, and owing largely to the recent introduction of many new and beautiful varieties its popularity is steadily increasing. It is hardy not only in the eastern provinces of Canada but also in the north-west portions where the winter climate is much more severe. At the branch experimental farms, at Brandon, in Manitoba, and at Indian Head, in Eastern Assiniboia, a number of varieties have been tested during the past five or six years and most of them have proven quite hardy and have borne flowers very freely for the past two years. The paeony succeeds well under almost every condition, and will thrive even in the gardens of the negligent and careless, but when well cared for, it responds to good treatment by producing a wealth of magnificent flowers of a most attractive character.

The tubers as supplied by the dealers, especially of the newer sorts, are comparatively small, and do not usually flower the first year, but they grow rapidly and if left undisturbed for three or four years they form extensive clumps which produce flowers in great number and of large size. The plant is propagated by division of the roots, but where fine flowers are desired the parent plants should be disturbed as little as possible. The flowers are very varied in color, assuming every hue and shade from the deepest crimson through all tints of red and pink to pure white.

Of the herbaceous paeonies, there are now in the collection at Ottawa 141 named varieties, consisting mainly of those sorts which have been produced within the past thirty or forty years by florists in Europe. Most of these were planted in 1895, with a more recent addition of about thirty varieties from Japan. They are arranged in three large beds, each containing three rows of plants put out three feet apart each way, and are planted so as to have the plants in the second row alternate, and those in the third row opposite those in the first row. A part of one jo these beds is shown in bloom on page 182. The mass of flowers produced under these circumstances, when the plants are well established, is very effective, and the beds are much admired when at their best in the latter part of June and early in July.

With so many beautiful varieties to choose from, selection becomes somewhat difficult. I shall, however, venture to name a few which appear to be among the most desirable of these which have yet been tested at the Experimental Farm.

In the group we have a single flower of a variety known as *Madame d'Hour*. This was planted in 1895, bloomed well in 1897, and magnificently in 1898 and is certainly one of the best in the collection. The flowers are very large and double, the petals nearly white with a delicate rosy tint becoming deeper in color towards the base. The specimen measured seven inches across and the blooms were produced in great profusion.

Berlioz, is another good sort. The flowers are large to very large, very double, of a deep rose color with paler shadings on the margins of the petals. This also was planted in 1895, made strong growth, bloomed freely in 1897, and very freely in 1898.

Ambroise verschaffelt is a charming flower of medium size, a deep crimson-color, and is very full and double and well formed, it also bloomed well.

BERLIOZ.

" DECAISNE."

Decaisne. This is a strong grower and free bloomer. The flowers are large, full and double, of a blush-pink color, paler in the centre. In addition to its other attractions this variety exhales a pleasant rosy odor.

Purpurea superba produces flowers which deserve to rank with the best. This variety is a strong grower and very free bloomer. The flowers are of a very deep rose-color finely formed and very attractive.

Papaveriflora is an elegant flower of good form and very double. Its color is white with a faint yellowish tint. The outer petals are wide, while those forming the inner part of the flower are much narrower, making a very handsome combination.

Solfaterre is not very double, but is very loose and graceful in form, the outer petals are wide and of a pale rose-color, while the centre is made up of much narrower petals which are almost pure white. This is a very free bloomer and is one of the sweet-scented sort.

The Japanese varieties were planted in 1897 and 1898, and all those which have bloomed have shown much grace and delicacy of form with striking combinations of color. Most of them have only one or two rows of outside petals which are wide and the centre is filled with a cluster or rosette of very narrow petals, delicate in form and hue, usually tinted with shades of yellow margined with pink. The Japanese appear to prefer these chaste and loose semi-double forms to the larger, stiffer and more fully double sorts; some of their flowers are of great beauty of form with wonderful delicacy in their tints.

Some-ganoko is a good representative variety of this class. The flower is of medium size, the outer petals of a deep blush rose with paler markings, the centre being filled with a lovely rosette of very narrow yellow petals neatly arranged, each with a thread-like base and tinted above with pink.

Kame-no-Kegoromo is a large, handsome, loosely double flower of a deep carmine-red color with a number of narrow petals distributed about the base of the wider petals, the former being crimped and twisted, yellow in color, margined with red.

" PAPAVERIFLORA."

Tatsu-gashira is also a very beautiful flower. In this variety there is a single row of wide petals nearly white, with the centre partly filled with a loose cluster of very narrow yellow petals tinted with rose.

Paeonia tenuifolia, which is shown in the front of the bed seen in frontispiece, is very striking on account of its finely cut foliage. It is a distinct species from the other sorts referred to of which there are two varieties in common cultivation, one of which is single, the other double, and both of a deep crimson-red color. This is a native of Siberia, is very hardy and is the earliest variety to bloom.

CARNIVOROUS PLANTS OF CANADA.

By D. W. Beadle, Toronto.

Although to the horticulurist as a commercial grower, flesh-consuming plants may not be of special interest, yet, as a student of plant life, a brief account of how some plants obtain nitrogen may be to him both interesting and valuable.

Those that will be mentioned fall naturally into two groups, the one composed of those that capture by means of closed chambers, or open pitfalls, so contrived that animals entering may not be able to get out. In some instances the pitfalls are made attractive by a display of brilliant color, and the downward way alluring by a spread of sweets. It is in a more enticing way the old story :

> " Walk into my parlor," said the spider to the fly,
> " I've the prettiest little parlor ever you did spy."

The other groups consist of those that perform certain movements specially designed to secure their prey.

There is a third group, to it belong plants, the leaves of which are provided with glands that secrete a sticky substance to capture insects and fluids to digest them. Some Canadian plants have sticky foliage, but the writer is not aware that it has been ascertained that any of them can digest the insects that may chance to adhere to the leaves.

The first group is represented in Canada by five species of bladderworts, which illustrate the closed chamber contrivance, and one species of pitcher plant which uses the pit-fall method. Of the bladderworts, four species live in ponds or pools, in bogs, one roots in mud. The aquatic species have no roots, they float just below the surface of the water, throwing up only flower stalks with their yellow flowers into the air. See figure 1, copied, as are all illustrations in this paper, from the "Natural History of Plants," by Anton Kerner, Professor of Botany in the University of Vienna.

The life history of these plants is as follows :—In the autumn spherical buds are formed at the ends of the branches, the leaves and old parts die, become saturated with water, sink to the bottom, taking of necessity these buds with them, where they remain all winter. On the return of growing weather these buds increase in size, become separated from the old decaying

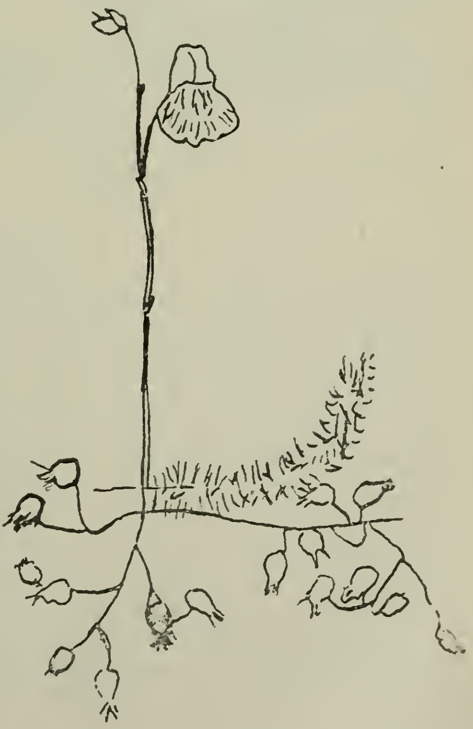


Fig. 1.

branches, ascend to near the surface and soon develop into a plant similar to that shown in Figure 1, with leaves and bladders. In some of the species all the branches are supplied with leaves, the bladders being distributed among them; other species have the foliage and bladders on separate branches.

The bladders are constructed in such a manner that each is a trap especially designed to catch small animals. Their form and general appearance is shown in Figure 2, considerably magnified. The opening into the bladder is at the base of the stiff tapering bristles, which are so placed around it as effectually to prevent any other than animals small enough to enter the orifice from even approaching. The entrance is formed with four rounded angles, nearly square in outline. The underside or threshold is strongly thickened, from which a solid cushion projects inward. To the upper side, or lintel, is fastened a thin transparent valve, which closes upon the cushion completely shutting the aperature. The valve is so elastic that it can be easily pushed up by the tiniest animal on the outside and so get within; as soon as it has entered, the valve instantly springs back to its normal position, and the venturesome prisoner is a captive for life. Over the entrance might truly be written—

"Who enters here leaves hope behind."

Sooner or later the captives die and decay. Lining the interior surface of this prison house are cells especially designed to absorb the products of this decay, which thus become a source of nitrogen to the plant. We learn from Kerner that the number of animals thus captured is comparatively large, that most of them are small crustaceans, supplemented by larvæ of gnats and other small insects. That they must needs be small is evident from the fact that the bladders themselves do not exceed five millimeters in diameter, about one-fifth down to one-twelfth of an inch. What is it that induces these tiny members of the animal kingdom to press open the door, as it were, and force an entrance into this death trap, is as yet an unsolved riddle. Mr. Kerner suggests that it may be to escape being drowned by larger predaceous inhabitants of the pool. Certainly none ever come back to warn their fellows.

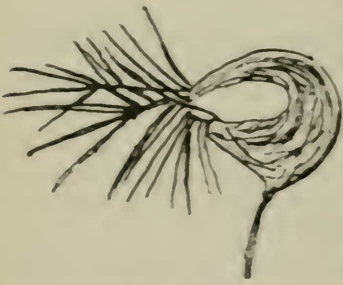


FIG. 2.

We give, for hoset who may desire to examine these curious plants, a brief account of the few species indigenous in Canada. Flowers yellow, one petaled, two lipped.

Utricularia vulgaris, the greatest bladder wort; bears numerous bladders interspersed among the leaves, from three to twenty flowers, found from the Atlantic to the Pacific.

U. intermedia. Flat leaved bladderwort; the bladders with rare exceptions are borne on leafless branches; flowers one to five, reported from Newfoundland, New Zealand, Quebec, in Ontario, from Ottawa west to London and northward at Lake Huron, Lake Superior and Lake Nipigon, also in Manitoba and the Rocky Mountains.

U. gibba. Humped bladderwort; few very small bladders scattered among the leaves and only one or two flowers; found at the eastern part of Lake Partridge, Addington County, Ontario (Macoun) and near Westminster, London, Ont. (Dearness).

U. clandestina. Hidden fruited bladderwort. This species, like our wild violets, has two kinds of flowers; one kind, like those of the other species, in number three to five; the others very numerous, and borne among the bladders under water, strictly cleistogamous, that is, fertilized in the bud, reported from Kent and Albert Counties, N.B.

U. minor. Lesser bladderwort. The bladders of this species are very small, about one-twelfith of an inch in diameter and not numerous, sometimes not any; the flowers from one to ten, flower stalk from two to six inches high. In a marsh at Mount Stewart, Prince Edward Island (Macoun), Labrador to British Columbia (Britton).

U. Cornuta. Horned bladderwort; grows in the mud at the margin of small lakes and ponds, flowers one to six; very abundant along Gulf River, between Big and Little Bushkong Lakes; Lake Nipigon (Macoun); reported from Newfoundland, Nova Scotia, New Brunswick and Quebec. The writer has seen it in bloom on the borders of small lakes near Gravenhurst in the month of July, but could not find any bearing bladders.

PITCHER PLANTS. The pitfall contrivance is formed by the metamorphosis on the leaves of the pitcher plants into sacs. There is one member of this family common in Canada, from the Maritime Provinces to the Rocky Mountains, growing in mossy bogs and marshes. *Sarracenia purpurea*, Pitcher Plant,] Huntsman's Cup. See Fig. 3, showing the rosette of leaves and flowers borne single upon the upright stalk.

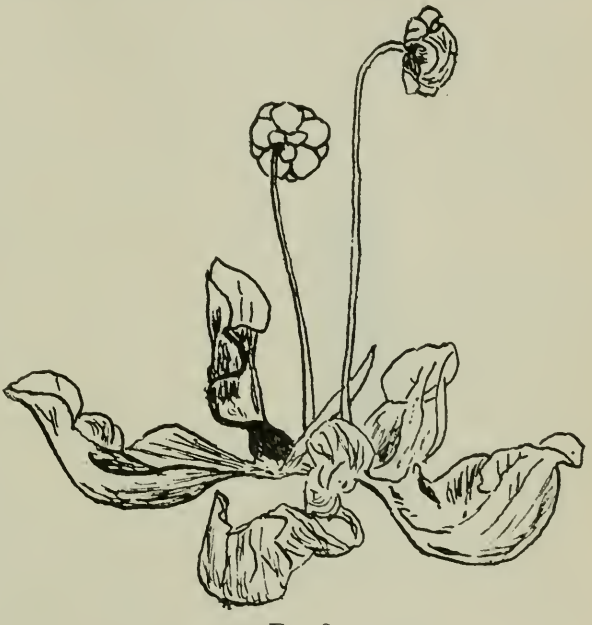


FIG. 3.

As will be seen by the engraving, the leaves, arranged in the form of a rosette upon the ground, instead of the usual flat leaf blade, and narrow leaf stock, has been changed, stalk and blade into lengthy sacs, resting upon their backs inflated about the middle, somewhat contracted about the mouth, which is raised up from the ground and bordered with a collar or sort of hood. This hood is streaked with red veins, often of a vermillion brightness, and holds its concave surface in a position to catch the rain drops and conduct them into the cavity below. Near the mouth the pitcher is provided on the inside with glands, which exude a sweet fluid that is spread thinly over what may be termed the throat. Below this the interior is lined with long, thin, sharp-pointed bristles. See Fig. 4, a section through the wall of the sac, showing the long, spinous bristles greatly magnified. The bright colors and sweets allure the insects, many glide down over the smooth slippery spines; after vainly endeavoring to climb the bristle-lined wall they sink exhausted into the water below and perish. When a number are decaying the water becomes turbid, resembling manure water. It is not yet known whether the fluid is mere rain water or whether the gland-like cells at the bottom exude a secretion which modifies its character. It is in this way that the Pitcher Plants obtain more or less of their required nitrogen. These comprise all of the Canadian plants embraced in the first group.

Turning now to the consideration of the second group, those plants that exhibit movements in capturing their prey, we find that the Canadian members are confined to two plant families, one also belonging to the Bladderwort family and four to the Sundew family. This one, which is placed by botanists in Bladderwort family, has no bladders, does not live in water, captures insects by the involution of its leaf margins. It may be briefly described as follows:—*Pinguicula vulgaris*, Butterwort. The leaves are entire, arranged in a rosette at the base of the leafless flower stalk, flower violet-purple, one-petaled, two-lipped, upper lip two cleft, under three cleft, nearly straight nectar-bearing spur varying from one-sixth to one-third of an inch in length. Its range is from Newfoundland and Quebec through Ontario to the Rocky Mountains In Ontario at Red Bay, Lake Huron, along the coast of Lake Superior from Michipicotin to Red Rock, on St. Ignace Island and on the east coast of Lake Nipigon (Macoun).

Figure 5 represents a flourishing plant. The upper surface of the leaves is covered with the numerous glands which secrete a sticky fluid that is poured out profusely whenever an insect or other nitrogenous body is brought continuously in contact with them ; to this, at such times only, is added another fluid similar to the gastric juice of animals. When small insects alight upon the leaf they are detained by the sticky substance already presented ; struggling to extricate themselves only makes matters worse by exciting the glands to a more abundant discharge. If they alight near the edge where the glands are less numerous, this part of the leaf gradually rolls inward to cover its prey. If the creature be too large to admit of that, it is pushed into the middle where the glands are abundant. The only movement is that made by the leaf margin, it is not rapid, it is slow ; if it folds over the insect it will remain in that position until its prey has been digested and absorbed, which is usually completed in twenty-four hours, when it will forthwith move back to its normal position.

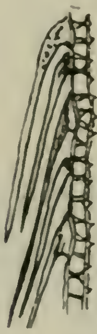


Fig. 4.

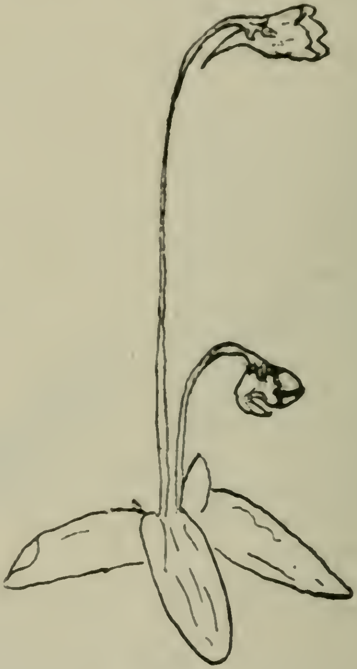


Fig. 5.

There is something almost startling when told that a member of the vegetable kingdom is endowed with sensation, a seemingly voluntarily power of motion, and digestion through the secretion of a digestive fluid like that of animals.

What becomes of the vanishing line between the animal and the vegetable kingdom ? Doubtless our *Pinguicula vulgaris* received its name of Butterwort from being greasy to the touch, but far more than a century ago its leaves were used in dairy farming to produce the same changes in milk that are now brought about by the use of rennet, so that its association with dairy products is more than fanciful.

The movements made by the members of the Sundew family are more striking, especially those of the leaves of Venus Flytrap, *Dionoea muscipula*, which are not found north of North Carolina. Nevertheless, the process of capturing small animals by those members growing in Canada are very interesting.

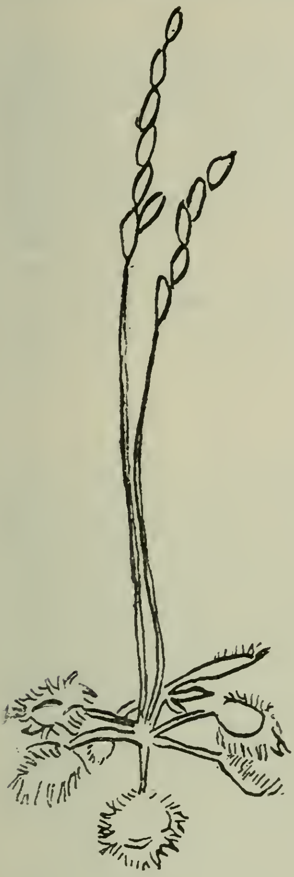


Fig. 6.

Upon the upper surface of the leaves of these plants are numerous delicate wine-red filaments, tipped with a tiny round knob, bearing a fluid droplet. These filaments are of unequal length, resembling a number of small pins thrust into a cushion to unequal depths, the shorter in the centre, the longer at the margin. Each leaf is said to contain about two hundred. The ball-shaped knob is a gland that secrets the tiny droplet which is transparent and sticky, sufficiently cohesive to be easily drawn out into threads. This droplet, glittering brightly in the sunlight much resembles a dewdrop, hence the name Sundew. When an insect or other organic nitrogenous body touches any of these glands they at once begin to discharge a true digesting fluid such as is secreted by the leaf glands of the Butterwort, and having the same properties as the gastric juice of the animal stomach.

Doubtless, many insects are deceived by the glittering droplets, mistaking them for honey, become entangled among them by reason of their adhesiveness, and in endeavoring to escape cause the glands to give out a more copious effusion and set the filaments in motion. The filaments to which the insects adhere begin to bend inward, much as we bend a finger into the palm of the hand. When this has bent down so that the prey is brought to the surface of the leaf, the filaments nearest to it will bend in the same manner, and when these touch the surface others adjoining follow, and this sort of movement by detachments is kept up until all the filaments are bent down. Figure 7 shows a leaf with half of the filaments bent over the captive. This is magnified, and illustrates the movement when the insect has been captured by one of the filaments on the margin of the leaf of the round-leaved series, by which it is necessarily brought into the centre. It must often occur that the capture is made by a filament other than one on the margin, but, whatever the position, the incurving filaments never fail in their aim. If two are captured at the same time the filaments divide into two groups. Indeed, all these movements vary according to the needs of the movement, so that the purpose to immerse the prey in an abundance of digesting fluid never fails of accomplishment. The filaments are also endowed with discrimination, for if grains of sand, or other non-nitrogenous bodies come in contact with the glands, though secretion is increased, no pepsin is discharged and no bending takes place. As soon as the prey has been digested the filaments resume their former position, the time occupied in absorbing the nutrient portions varying with the size of the captive. It is surprising to find that they capture so many and so large

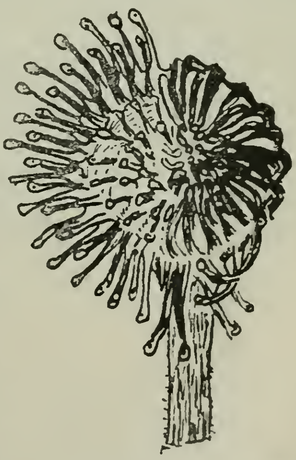


Fig. 7.

insects, not midges only, but ants, flies, small butterflies, dragon flies, these larger being secured by the co-operation of two or three leaves. The remains of thirteen different insects have been found upon a single leaf.

A brief mention of the several Canadian species of Sundew will close this paper.

Drosera rotundifolia. Round-leaved Sundew, grows in bogs and marshes from the Atlantic to the Pacific. See figure 6, natural size. *D. intermedia*, Spatulate Sundew, in bogs and margins of lakes throughout Quebec and northern Ontario to Manitoba. Both of these are abundant in mossy beds bordering Holland River west of Newmarket.

D. longifolia, Oblong-leaved Sundew, in boggy ground along the shores of Lake Huron, Bruce Peninsula, Manitoba and British Columbia (Macoun).

D. linearis, Slender-leaved Sundew, in marshes of Lake Simcoe, Chicken Bay, McLeod's Harbor and Cockburn Island. Lake Huron to Manitoba and Rocky Mountains.

SHADE TREES.

By Prof. W. Lochhead, O. A. C., Guelph.

Many inquiries were made this year regarding the treatment of shade trees which were showing signs of lack of vitality. In some cases the cause of the unhealthy condition of the trees was plainly due to insects, in other cases to fungi, but most frequently the cause was due to purely physiological conditions, such as unfavorable conditions of the soil, or atmosphere.

The towns and cities of Ontario can point with pride to their beautiful avenues of trees which not only furnish a grateful shade from the sun's rays during the hot days of summer, and cause refreshing breezes to blow along the pavements, but also give shelter from the winds and storms of winter. The larger the town or city the more attractive these trees become by way of contrast with the long walks of naked brick and stone.

The value of shade trees lies not only in the shelter and shade they furnish, but they also conduce to healthiness, and their value in this connection can scarcely be estimated.

Part I.—Care of Trees.

That many of these valuable trees are dying, or are in an unhealthy condition due to physiological conditions, is a fact that requires attention on the part of their owners, and it is the purpose of this article to point out the remedies that may be applied to invigorate these trees, and the causes which bring about these undesirable conditions.

(1). Trees, like animals, require food, and if the supply runs out they must inevitably starve. One of the chief causes for the unhealthy, dying condition of so many trees is this lack of food supply.

It is true that a tree makes use of the almost inexhaustible reservoir of carbonic acid gas in the atmosphere, and the water in the soil, but it should not be forgotten that a tree requires inorganic food which is absorbed by the roots. A farmer does not expect a crop from soil which contains no nourishment, but somehow or other many persons entertain the very erroneous idea that a tree ought to grow and thrive for years upon the food which happens to be in the soil in the immediate neighborhood of the roots.

Very frequently when a tree is planted, the earth which has been thrown out in making the hole is thrown back again and packed about the roots. The amount of food in such a case will not suffice for any length of time. Sometimes the tree will live and thrive for several years; then it is because the soil has been richer than usual. Every year the ground for a yard or more should be padded deeply, and a dressing of well-rooted manure or compost applied. In doing so a constant supply of food will be maintained, and the tree will grow and thrive.

(2). A second cause for the disease of vitality in many shade trees is the lack of perfect circulation of air in the soil. The vital processes in the roots demand a supply of oxygen, and if this gas is excluded the roots die of asphyxia, or root rot. Oxygen is required, not only for growth, but also for the formation of reserve materials. A good florist knows how to provide for drainage in potted plants ; he knows that a hard clay bottom is unsuitable. Too much water and soil of too close a texture will prevent the circulation among the roots and root-hairs, and a free interchange of the atmospheric and soil gases. The best foresters advocate drainage for every tree. Too often the water which is given the tree, lodges in the hole made for the tree, so that the soil becomes saturated and aeration is prevented.

When trees are planted along the sides of cement pavements and paved streets, as is the case in many of our towns and cities, they suffer from an imperfect supply of air among the roots.

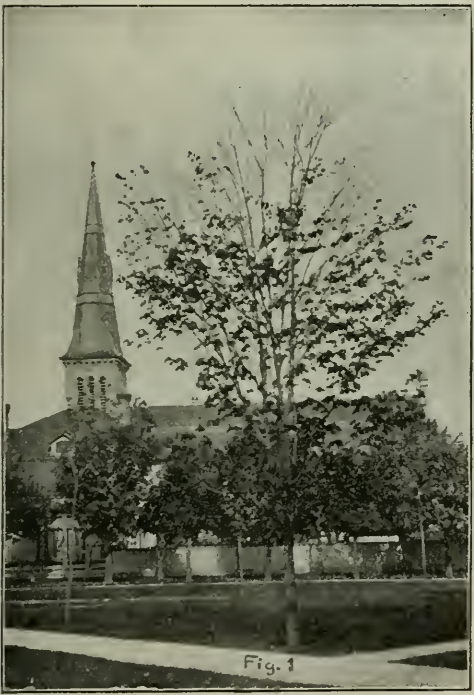


FIG. 1. Maple Tree affected with Stag Head. Suffering from lack of proper drainage.

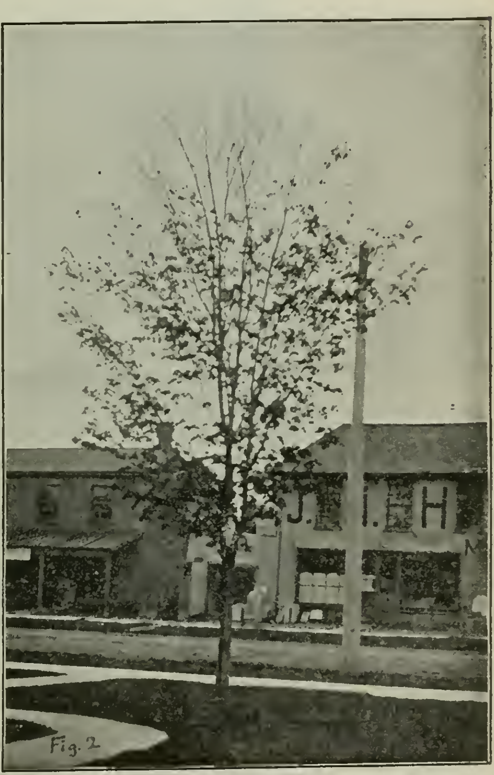


FIG. 2. Maple Tree suffering from Stag Head. (Due to lack of proper nourishment.)

The hard impervious pavement prevents, not only a proper supply of oxygen, but also proper evaporation from the soil beneath.

A common form of disease arising from the diminution of the supplies of food and water, is Stag Head—"when the top branches become leafless, dry off and remain as dry sticks, like antlers projecting from the foliage." The lower branches remain green, but make but little growth.

In the treatment of Stag Head, the soil should be removed from a space two or three feet in radius about the tree. This circular area should be frequently stirred by the spade and kept raked, as this process will tend to promote aeration; but unless provision has been made for proper drainage when the tree is planted, aeration will be perceptibly checked whenever a prolonged wet period occurs. The young rootlets decay, the tree is weakened, and becomes more liable to attacks of fungi, which prey upon the roots.

(3). Another cause for the death of many trees in Sun Scald, which produces a wilting of the tissues by a too rapid evaporation from the leaves. The tender young shoots are very liable to injury from such a source, especially if they are subjected to a hot sun after a period of rapid growth in moist weather. The edges of the leaves turn reddish yellow, wilt and dry up.

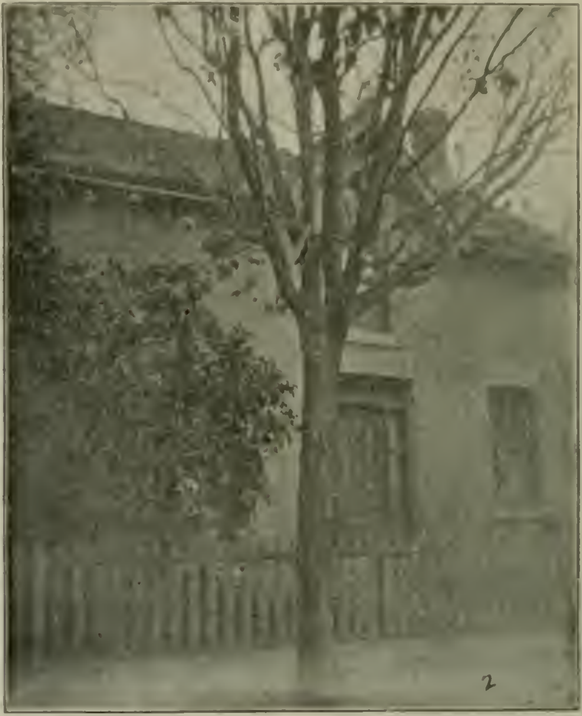


FIG. 3. Work of Borers on Maple Shade Trees.

(4). A cause which produces practically the same results as Sun Scald is known as Winter Blight. The tissues wilt, owing to too rapid evaporation during fine, warm days in winter, when the soil about the roots is frozen, or when dry cold winds prevail.

It is very difficult to provide remedial treatment for Sun Scald and Winter Blight. Perhaps a liberal mulching with manure or straw would be as efficacious a remedy as any that could be devised.

(5). Other causes occasionally produce serious results but only under peculiar circumstances. Sometimes the air of cities and towns becomes poisoned with harmful gases to such an extent that whole avenues of trees are seriously affected. There is of course no remedy available in such a case.

A few words may be said as to the treatment of old trees which are showing signs of lack of vitality. Growth may often be stimulated by assisting nature when the roots have become sluggish. The branches should be pruned so that the demand upon the roots may not be exceeded by the transpiration from the leaves. The turf, moreover, should be removed and the soil given a top dressing of compact earth before replacing the sods, so as to allow the nutrient salts to be washed down to the rootlets by the rain.

All decaying patches or holes should be mended by clearing off all rotten wood, and the place finally closed up with pitch or coal tar to prevent the entrance of fungi.

PART II.—INSECT ENEMIES.

The insects which attack trees may be divided into three groups, viz., Borers, Leaf-eaters, and Sap-suckers. The Borers are chiefly the grubs of beetles; the Leaf-eaters are chiefly lamellicorn beetles, and the caterpillars of certain moths, and the Sap-suckers are hemipterous, or half-winged insects. A knowledge of the life history of these injurious forms is of great service in the fight against them, and can readily be obtained by a reading of the standard works on insects.

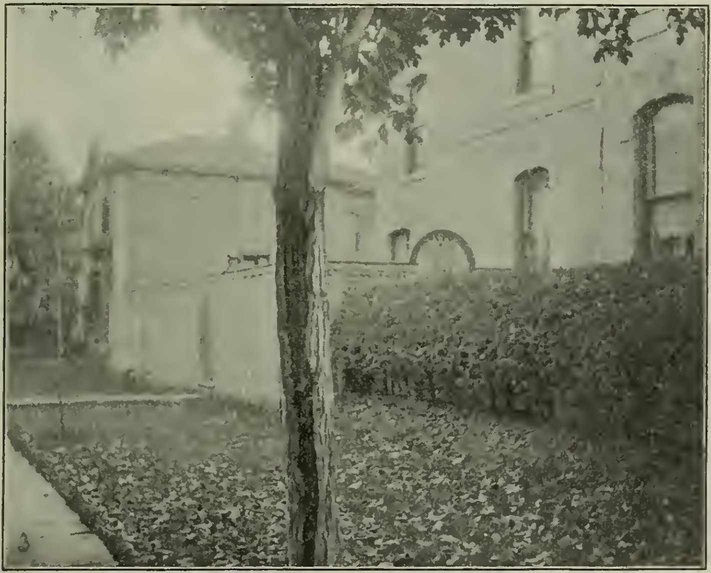


FIG. 4. Work of Borers on Maple Shade Trees.

1. The chief borers are the Round-Headed and the Flat-Headed Borers. The Round-Headed Borer (*Saperda candida*) is, perhaps, well known to many of the readers of this magazine; but for the benefit of those who are not yet acquainted with the pest, I shall give a few facts about its life history and general appearance.

The beetle is about an inch in length, and has a broad, white stripe running lengthwise along each wing cover. The general color of its upper surface is light brown. Its feelers are quite long and jointed. The grub is over an inch in length when full grown and has a peculiarly shaped head, which is quite characteristic, being rounded, and much greater in diameter than the body. The pupal condition is seldom seen because it does not remain a pupa for any length of time.

Near the end of June the beetle lays her eggs close to the ground on the trunk of the tree, under some loose bark. The young grub or larva eats its way through the bark into the sap-wood, where it remains usually a year, then it bores up into the hardwood whence it emerges as a beetle after a sojourn of nearly three years. The last month prior to emergence from the tree is spent as a pupa at the upper end of the burrow. The tunnel in the sap-wood is flat, and is usually nearly filled with saw-dust castings.

The beetle emerges about the middle of June, and proceeds with all dispatch to prepare for the laying of the eggs. Figures 3 and 4 show very clearly the characteristic markings these beetles make upon trees. The owner of the trees tried to cut out the grubs, but this method produced the big, ugly scars which made the trees unsightly. The adoption of this method of treatment supposes that an ugly shade tree is preferable to a dead or dying one. The best remedy is a combination of preventive and destructive measures. In the fall the trees should be carefully examined and wherever there are indications of saw-dust, the tunnels should be probed with a stout wire so as to kill the grub. Again in June, the trunks of the trees should be treated with a mixture, which will prevent the deposition of the eggs. A carbolic soap mixture, made by adding a pint of crude carbolic acid to a quart of soft soap dissolved in two gallons of boiling water, applied with an old scrubbing brush, has been found very effective. A whitewash applied on the trunk and well up into the branches is also to be recommended.

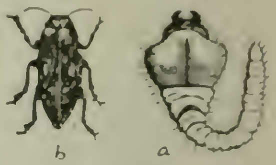


FIG. 5.

The Flat-Headed Borer (*Chrysobothris femorata*) is almost as destructive as the Round-Headed Borer, and has a very similar life history. In appearance, however, it is quite different, the beetle is about half an inch long, flattened and of a dark green bronzy color. (Fig. 5). The grub, or larva is light green in color, about an inch in length, and with a very conspicuous head which is flat, and very broad compared with the body. Usually, it does not take so long for this insect to pass through the various stages of its life history as is the case with the Round-Headed Borer. The period varies from one to three years, generally one year. As in the case of the Round-Headed, the beetle deposits her eggs about the end of June. The young grubs bore into the sap wood where they tunnel out flat channels, sometimes girdling the tree. These tunnels are not so regular, and do not penetrate so far into the hardwood as do the tunnels of the Round-Headed Borer.

As a rule the eggs are deposited on the trunk a few feet from the ground.

The same remedies may be used against these pests as have been found effective with the Round-Headed Borer. Prof. Comstock advises the placing of one or two cakes of soap in the forks of the trees, so that the rains will dissolve the soap and wash it down over the trunks.

It may be said here that these two borers are not only destructive to shade trees, but to apple, quince and pear trees.

There are other borers which also do much harm. The Locust Borer (*Cyllene robiniæ*) is destructive to locusts in some localities. The beetles of these may be collected quite readily on Golden Rod in the fall. They are black with many yellow bands crossing the wing covers.

Many locust trees can be found whose trunks are perforated by holes made by the grubs of these beetles. The holes extend through the bark into the hardwood, injuring the trees so badly that death soon follows.

The grubs complete their full growth in one year. Much can be done in the winter to rid the trees of these and like borers by cutting off all dead and dying branches, and burning them before the insects have a chance to escape.

Maple trees are often troubled with borers (*Plagionotus speciosus*) which are closely allied to the Locust Borer. This beetle is a very pretty creature, being marked with yellow and black stripes. The eggs are laid in summer, and the grubs bore into the wood where they may be destroyed by a stout wire in the spring.

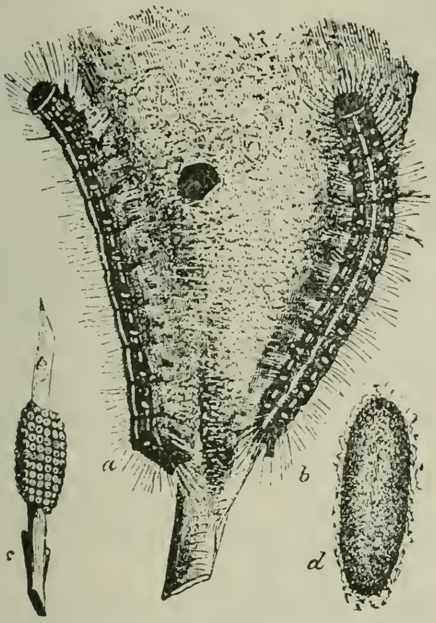


FIG. 6.

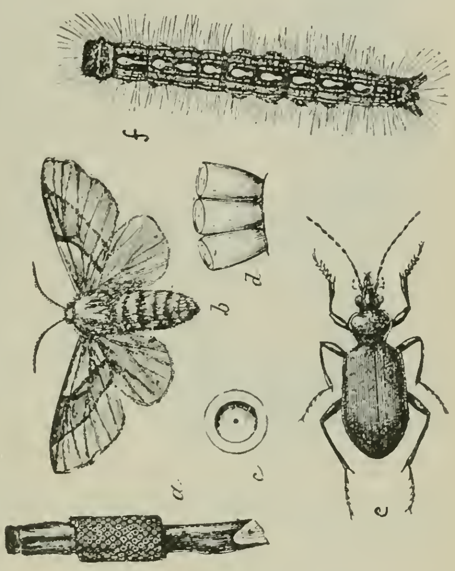


FIG. 7.

2. The chief Leaf-Eaters which infest shade trees are the Tent and Tentless caterpillars the Tussock caterpillar, the Fall Webworms, and the Bag-worms, all of which are larvæ of moths

The American Tent and Forest Tentless Caterpillars (*Clisiocampa Americana* and *disstria*) are doubtless familiar to most readers. The accompanying figures (Figures 6 and 7) show the characteristic features of the eggmasses, larvæ, tent and moths. Much may be done to lessen the ravages of the Tent caterpillars by the destruction of the egg masses in the fall, winter and spring and by burning the tents as soon as they appear in the spring, but there seems no practicable method of dealing with the Tentless caterpillar, which soon comes from the woods to the orchards and lawns. These make their homes primarily in the forests, where it is impossible to clear off the egg masses.

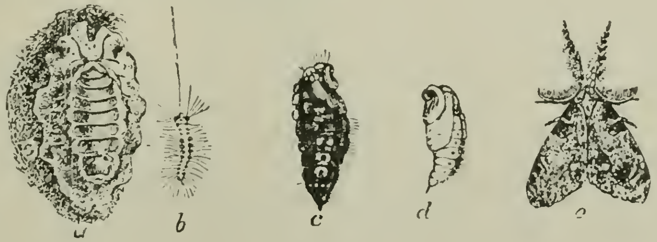


FIG. 8.

All shade trees should be sprayed, as soon as leaves are opened, with arsenate of lead solution, made by dissolving in a wooden pail three ounces of acetate of lead in one quart of water, and in another wooden pail dissolve one ounce of arsenate of soda in one pint of water; empty the contents of each of the pails into a barrel of water (40 gallons). Stir well and add one quart of glucose. Tar bands, moreover, should be placed around the trunks, and pyrethrum powder may be used to advantage about the tree.

The Tussock caterpillar (*Orgyia leucostigma*) is very destructive some years, but with care the trees may be kept free from its ravages.

The white, froth like masses of eggs, which remain over winter on the trunks and larger branches, and even on buildings and fences near by, may be scraped off and destroyed during the winter. If a few survive this treatment to show themselves as larvae, spraying with Paris Green will kill most of them. The bands of tar brushed on the trunks three or four feet from the ground will prevent the wingless female from ascending the trees to lay her eggs.

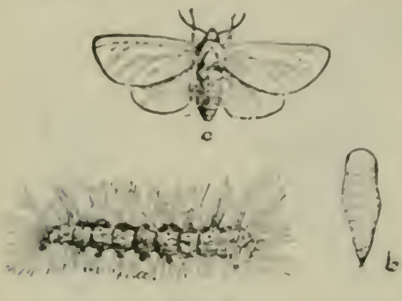


Fig. 9.

The Fall Web worm (*Hyphantria Cunea*) is another serious pest of shade trees. (Fig. 9.) The moth is either pure white or white spotted with black and is a very pretty creature. It lays a cluster of 300 or 400 eggs on the leaves. The caterpillars leave the web and crawl down the trunk to the ground to spin their cocoons, within which they pass the winter as pupae. Several methods may be adopted to rid the trees of the pest. The collection of the cocoons, and the spraying with Paris Green are both effective: but, perhaps, the most effective mode of treatment is to burn the webs and the contained caterpillars. A long pole, to the end of which a swab saturated with coal oil is fastened, makes a good torch for burning the webs.

The Bag-worm (*Thyridopteryx ephemeraeformis*) although rare with us on shade trees, is a pest in some cities to the south of us. During the winter silken bags, to which bits of leaves and sticks are attached, may frequently be found on the twigs of conifers and other trees. These bags contain eggs which hatch in the spring, the little caterpillars emerging from the bags and feeding upon the leaves. They become mature or full grown in late summer, when the bags, which they have constructed and carried about with them, are fastened securely to branches or sometimes to fences near by. Within the bags the caterpillars change to pupae. The male moths soon emerge but the female moths, being wingless and passive, never leave the bags, where they lay large masses of eggs.

The surest remedy for the bag worm is to pick the bags during the winter and destroy them. If the bags are destroyed no caterpillars can make their appearance unless they come from some outside source.

3. The chief Sap-suckers are the Woolly Maple Bark Louse, or the Cottony Maple Scale, the Spruce Gall Louse and several kinds of armoured Scale-insects. These all have mouth-parts adapted for sucking the juices of the plants they infest.

The Cottony Maple Scale (*Pulvinaria innumerabilis*) is very frequently injurious to maples (Fig. 10). These scales attract attention in the spring by the large cottony masses which envelop them. Within the cottony masses are the eggs, from which in a short time the young lice hatch and spread over the branches and twigs. They soon settle on suitable spots, and begin feeding by sucking the sap. Full growth is reached about the beginning of September when the winged males appear. The females, however, remain under the scale all winter, and in the early spring the eggs are deposited in the fluffy, cottony masses. The application of water by hose connected with the city or town waterworks has been found effective in dislodging the eggs, and in brushing off the lice while moving about.

The Spruce Gall Louse (*Chermes abietis*) is, undoubtedly, a serious pest of the white, and other varieties of Spruce. During the last few years, it has done much damage throughout the Province. In the early spring about the first week of May, woolly, fluffy masses may be seen on the terminal twigs of the spruce, and if these be examined large numbers of eggs may be found. In another week the lice hatch, and settle at the bases of the young shoots, which soon show the characteristic curl. (Fig. 11). The base of every infested leaf becomes enlarged and gall-like. The larvae are safe from insecticides as they now live within the base of the leaf. About August 10th, the winged female adults appear, and prepare to lay eggs for a second brood. Lice soon hatch, and spread over the limbs, but those that survive the first winter seek shelter at the base of buds. The second brood of adults appear at the beginning of May, when the fluffy, wooly egg masses are seen.

If the trees are sprayed thoroughly with a mixture of soap solution and tobacco solution soon after the eggs are observed most of the young will be killed. The operation should be repeated in August, when the second brood of lice make their appearance.

Although several armored scales were observed on shade trees during the past season, and perhaps some damage done to the trees, yet no general complaint has been made against their work.

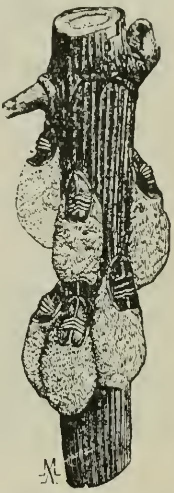


Fig. 10.

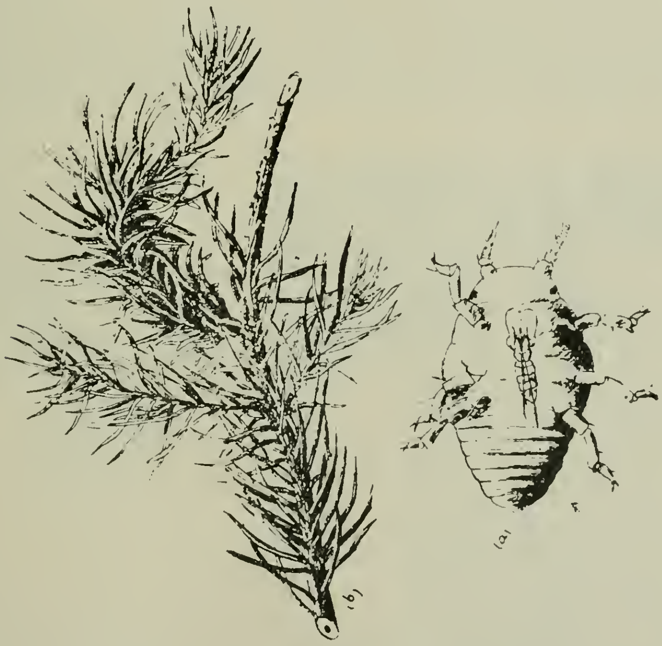


Fig. 11.

FUNGUS DISEASES OF SHADE TREES.

By Profs. W. Lochhead and M. W. Doherty, O.A.C., Guelph.

It is a matter of common observation that fungi play a very important part in the life of many trees, and frequently the most serious disturbances of their vital processes are brought about by the action of these lowly organized plants. It must not be supposed, however, that all the fungi, living in vital connection with trees, are harmful, for recent studies show that many of our common trees, such as pine, spruce, tamarack, beech, oak, hazel, hornbeam and birch, have their fine rootlets covered with a sheath of fungous threads by means of which the feeding processes are accomplished. These fungous threads, or mycelium, take the place of the root-hairs of ordinary plants, and absorb the food materials from the soil. There are other examples of the fungi and roots living in intimate vital connection, and for their mutual welfare. Most of the members of the heath family, most of the perennial plants living in meadows on peaty and humus soils, and the members of the legume family, have fungi living symbiotically with the roots.

Inasmuch as fungi are incapable of manufacturing plant-food out of inorganic food-materials, and must feed upon the already prepared food in the decaying vegetable matter of the soil, it becomes highly necessary that the supply of humus be maintained in the form of litter and forest mould in our parks and woods.

The fungi affecting shade trees may, very conveniently, be divided into three classes, according to the parts of the trees they affect: 1. Fungi affecting the roots and base of trunk; 2 Fungi affecting the stems; and 3. Fungi affecting the leaves.

1. FUNGI AFFECTING THE ROOTS AND BASE OF TRUNK.

The entrance of fungi into the roots of trees is determined to a large extent by the conditions of situation and climate. Where the tree has been weakened by any of the physiological causes discussed in the February number of this magazine, the roots are unable to prevent the development of those fungi which find an entrance into the tissues.

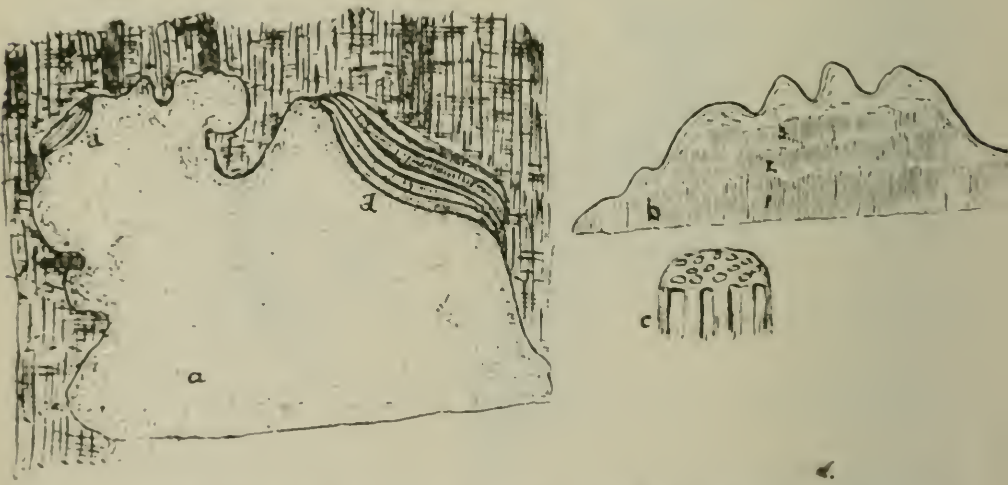


FIG. 12. *Trametes radiciperda* (Root-Rot of Conifers), *a*, part of a fungus showing the crust following the irregularities of the bark, and the two projecting shelves; *d*, both composed of several overlapping shelves; *b*, a section of the crust showing the three layers or thickness of tubes 1, 2, 3; *c*, a portion of the spore-tube layer showing the tubes and their openings or pores slightly magnified. (After Massee.)

(a) TREE ROOT-ROT. (*Agaricus melleus.*)—This destructive toad-stool is a very common fungus, not only on all kinds of fruit trees, but also on the forest trees, shade trees and conifers The cap of the toad-stool, when full grown, is two inches across, and has a honey color. The stock is often four inches high, and the gills and spores are white.

The spores are distributed by the wind chiefly. On germination delicate, cob-web-like threads are produced, which soon form a blackish covering on the roots. The roots are penetrated by the threads, which make their way between the bark and the woody part. Gradually the whole mass of tissue of the cortex of the root, as high as the crown, is literally choked with the fine threads, and the vital activities of the plant are seriously interfered with. During late stages of the disease I have frequently seen the surface of the almost dead roots covered with a matted, white felt of threads.

The fungus is not content to remain on a single tree, but will send out dark, radiating threads through the soil to roots of other trees, which are attacked in a manner similar to the first.

REMEDIES. From what has been already said it is evident that there are two sources of infection of trees ; (a) by spores, and (b) by the fine black radiating strands underground. These two sources suggest two methods of treatment : (a) by preventing the formation of the spores on the gills of the cap, and (b) by isolating infested trees, for it is impossible to kill the fungus after it has once made an entrance into the roots. All the fruiting forms, or caps, should be destroyed by burning. Infested trees, which are considered too valuable an healthy to destroy, should be isolated by a ditch about ten inches deep, dug around the tree. This will prevent the underground strands from reaching other trees.

The disturbances produced by the presence of fungal threads are far-reaching, The transpiration of water, when the leaves are affected, is seriously interfered with ; the cells of the parts affected are gradually destroyed through the consumption of the cell-contents ; and chemical changes are initiated which results frequently in the malformation, hypertrophy of tissues ; and finally death ensues.

(b) ROOT-ROT OF CONIFERS. *Trametes radiciperda*). (Fig. 12). This is a very common fungus on roots of conifers. The mycelium may pass from a diseased root to another close by which is not diseased, and in this way a single tree may infect a large number. On infection the cells of the wood become brown, and white patches make their appearance. Flattish, fruiting structures form on the surface of the roots, while the shelf which appears on the roots and stumps resembles a white crust or cake, nearly an inch across. The upper surface of the little shelf is brown, and the lower surface is white. In all cases, save the Scotch pine, the disease soon ascends into the stem. Moreover, it is thought that mice and other burrowing animals assist in the dissemination of the spores.

REMEDY. As with *Agaricus melleus*, the shelves should be removed to prevent the spread of spores, and a ditch dug about the diseased tree to prevent the infection of the roots of neighboring trees.

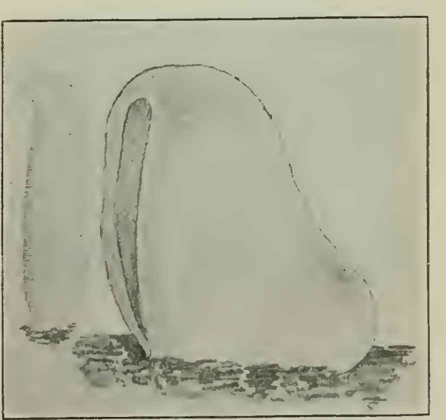


FIG. 13. *Polyporus betulinus* (Birch shelf fungus), showing the horse-shoe shaped shelf. (After Massee).

2. FUNGI AFFECTING THE STEMS OF TREES.

(a) HEART-WOOD ROTS. (*Polyporus sp.*) One of the most common objects seen in parks and woods is the large shelf-like fungus projecting from the trunks of both living and dead trees. The various species have quite characteristic shelves—*e.g.*, the shelf on the birch is shaped like a horse's hoof, that on the oak and willow is crispy a d wavy margined, while other forms may be hemispherical. (Figs. 13 and 14).

The heartwood is usually the first region injured, afterwards the sapwood. Wherever a crack or wound permits the thread of the internal mycelium to get to the surface, one or more of the shelves will be found. It is by means of wounds that the mycelium, produced by germinating spores, finds an entrance into the inside of the tree. In a few years the heart of a tree may become entirely rotten; but it is "usually several years from the time a tree is first attacked until its death." The majority of these shelf fungi spread by means of spores liberated from minute pores on the under side of the shelf; while a few, like the root-rot fungus, spread chiefly by underground mycelia, "from tree to tree along decaying roots."

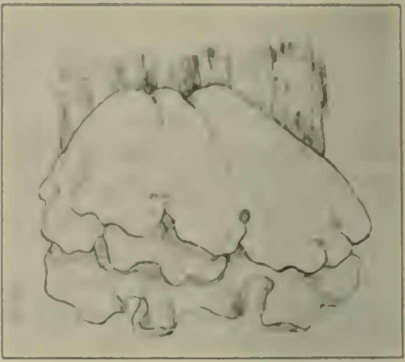


Fig. 14. *Polyporus sulphureus* (Heart wood Rot), showing the irregular and wavy margin. (After Massee.)

Remedies. In the case of trunk-infesting forms, the fungous shelf ought to be destroyed whenever it is seen, thereby preventing the liberation of the minute spores. All broken branches, moreover, should be carefully trimmed and treated with some protective fungicide, such as tar. With root-infesting forms, where the mycelium crawls from tree to tree by means underground, decaying roots, it becomes necessary to remove the cause of the spread. The earth at the base of the tree may be freed from all decaying roots, and all injuries carefully treated with tar.

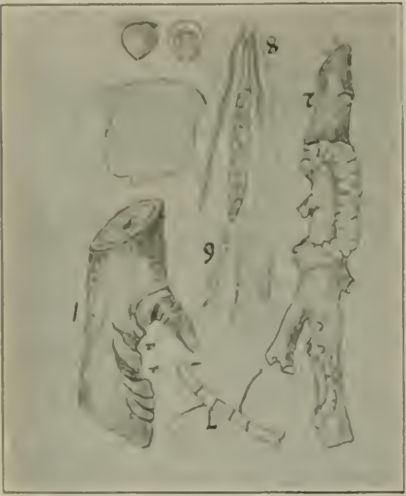


Fig. 15. *Nectria ditissima* (Apple-tree Canker); (1) a branch recently attacked, the disease entered at the axil of the small branch, a perithecia; (2) a branch diseased for some time, showing the rugged, raised margin about the wound; (6) conidia spores; (7) germinating condiumspore; (8) ascus containing spores the asci are contained in the perithecia. (After Massee.)

(b) CANKERS (*Nectria and others*). The cankers are not nearly such conspicuous objects as the shelf-fungi. Some of the cankers have dark colored fruiting forms, while others have bright red forms. Nearly every kind of forest and shade tree is liable to infestation by these fungi, and the infested trees are sources of rapid spread of the disease to the other trees of the park.

The most common cankers are the Apple Tree Canker, Spruce Canker, Larch Canker, and the Coral Spot Canker. (1) The Apple Tree Canker (*Nectria ditissima*) is very frequently found on the common forest and shade trees. Gaining an entrance through a wound, the mycelium attacks the bark, which it destroys in a characteristic manner. As the bark cracks concentrically, the area of diseased portion gradually enlarges, so that sometimes the trunk is completely girdled. Usually the diseased area is surrounded by a thick, irregular margin, which is also quite characteristic. In late fall whitish cushions of mycelium come to the surface, and produce minute spores, while in spring bright red cavities appear, containing the asci and spores. (Fig. 15).

(2.) The Spruce Canker, (*Nectria cucurbitula*), is chiefly found on the spruce. The fungus gains an entrance through a wound, and attacks the tissues of the cortex and to some extent the wood. When the bark becomes moist the myclium may come to the surface and produce minute spores, and later in the season red perithecia are formed, and spores are liberated from asci.

(3.) The Coral Spot Canker, (*Nectria Cinnabarina*), is often seen on maples, horse-chestnuts, and red currants. This fungus is most commonly found on dead twigs and branches, where the bright coral-like warts are frequently very conspicuous. Like the spruce-canker the spores germinate on being brought to a wound, and the mycelium makes its way into the tissues beneath. The coral warts are not observed until the death of the twig.

(4.) The Larch Canker (*Peziza willkommii*). (Fig. 16). In low-lying regions the larch is frequently attacked by this fungus, which has found an entrance through some wound. The presence of resin on the diseased twigs, oozing from cracks in the bark, and yellow, wilted leaves, reveal the progress of the disease. The spores are formed in asci sunken in the infested spots. Year after year the canker spot enlarges, and soon girdles the tree. The fungus may be readily recognized by the saucer-shaped fruiting area; the internal part of the saucer being orange-red, and the outside white and downy.

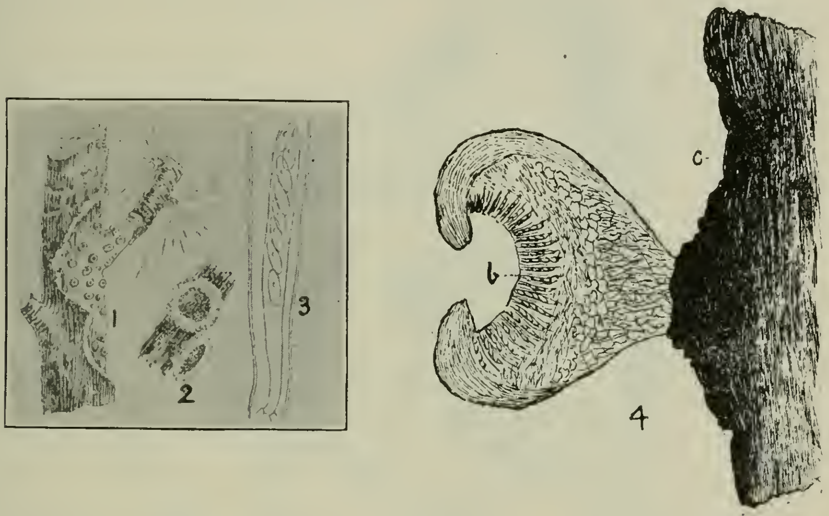


Fig. 16. *Peziza willkommii* (Larch Canker), (1) showing a portion of a branch diseased; (2) two apothecia slightly magnified, (3) an ascus containing eight spores, (4) a section of an apothecium greatly magnified, showing the asci and spores in them (b). (1, 2, 3 after Massee, 4 original.)

REMEDIES. Since all these cankers are wound parasites, it is necessary to keep a strict watch on all our shade trees for wounds. Whenever they are found they should be dressed with a solution of green vitriol, and afterwards with a coating of tar. It is also very essential that diseased twigs be removed as soon as seen, and that the fungus be not allowed to produce spores.

(c) THE PINE FUNGUS (*Trametes pini.*) (Fig. 17). When fully developed this fungus is readily recognized as one of the shelf-fungi (Polyporids). The shelf is irregularly triangular in form, two or more inches across, of a reddish brown color, and with the cap concentrically grooved. As ordinarily observed the fungus is characterized by white blotches or expansions on the bark, and by the reddish-brown color of the diseased wood.

Inasmuch as the mycelium gains access to the tree through wounds, and the external portion does not make its appearance until the mycelial threads are very numerous within the tissues of the tree, it is the duty of the owner to treat all wounds immediately on discovery, and to remove all trees which show any outward signs of disease.

(d) Pine Cone Fungus (*Peridermium pini*) (Fig. 18). This fungus is quite a common thing on pines in Ontario. A characteristic feature of the diseased condition of the tree affected is the "resin top," caused by the death of the upper branches through the stoppage of the upward current of sap in the wood. The mycelium is perennial, *i.e.*, growing on from year to year. Cells which are attacked lose their normal content, and secrete turpentine to such an extent that resin frequently overflows from cracks in the bark. Much irregularity in the growth of the trunk of the tree results from the destruction of the cambium. The stage of the fungus which is found on pines is the "aecidial" or cluster-cup stage, appearing in early summer as sausage-shaped swellings filled with spores. (Fig. 18).

Remedy. The only available remedy is the destruction of the tree, so that the disease may not spread to other trees.

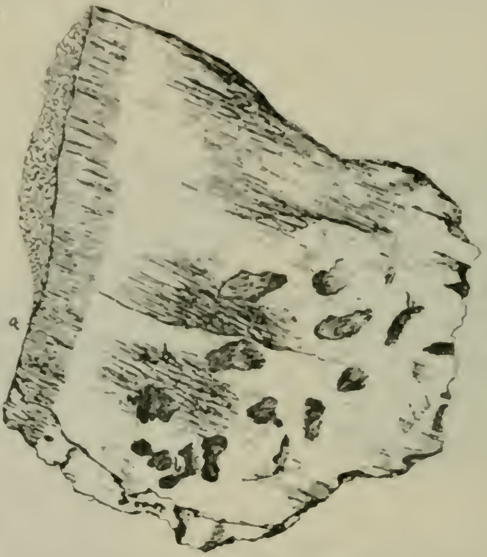


Fig. 17. *Trametes pini* (Pine Fungus). A section of diseased wood, (a) the pores in which the spores are produced, (b) the affected tissue which is saturated with resin and partially decomposed. (Original).

(e) Cedar Apple and Apple Rust (*Gymnosporangium and Roestelia*). (Fig. 19). It is well known that certain stages in the life of the rust of wheat (Puccinea graminis) are passed on the wheat and the other stage on the barberry. The parasite which causes "apple rust" passes part of its life on apple leaves as *Roestelia*, and the other stage on the cedar or juniper as *Gymnosporangium*. Nine species are known in this genus: two on white cedar only, three on red cedar only, two on both white and red cedars, one on the common juniper, and one on the western juniper (*J. occidentalis*) The mycelium is perennial in most species, and the abnormal growths depend to a certain extent on the part affected, and the rate of growth of the fungal threads. Growths on the affected leaves are called "cedar apples." (Fig. 19). Distorted branches are very common forms of the disease, and are known as "witches broom" The resting spores produced on the cedars and junipers, under favorable conditions, germinate and soon liberate spores of a slightly different nature. These, falling on the leaves of the apple, produce the "apple rust."

(f) Lichens. Lichens are extremely common on all kinds of trees. They form incrustations on the bark, and may be either leathery or semi-gelatinous in texture. It is conceded by most authorities that the lichens do not get their nourishment from the trees they incrust, but use their position on the bark as a means of getting a better livelihood from the air. The surface of the lichen is specially adapted for absorbing dew, rain or mists very quickly, and their food materials are obtained from the air and the moisture which reaches the plant. Mineral salts are brought to the lichen by the dust in the air, and probably also by the dead bark or the decaying leaves on the bark. Lichens are really dual plants, composed of fungi and algae—the fungi holding the algae as slaves in the mesh-work of the hyphae. The algae, containing chlorophyll, can make organic food out of the inorganic materials at their command, while the fungus can feed upon the organic food thus prepared. (Fig. 20). It is very evident that the lichens which incrust the bark of a tree do much harm, in that the breathing pores

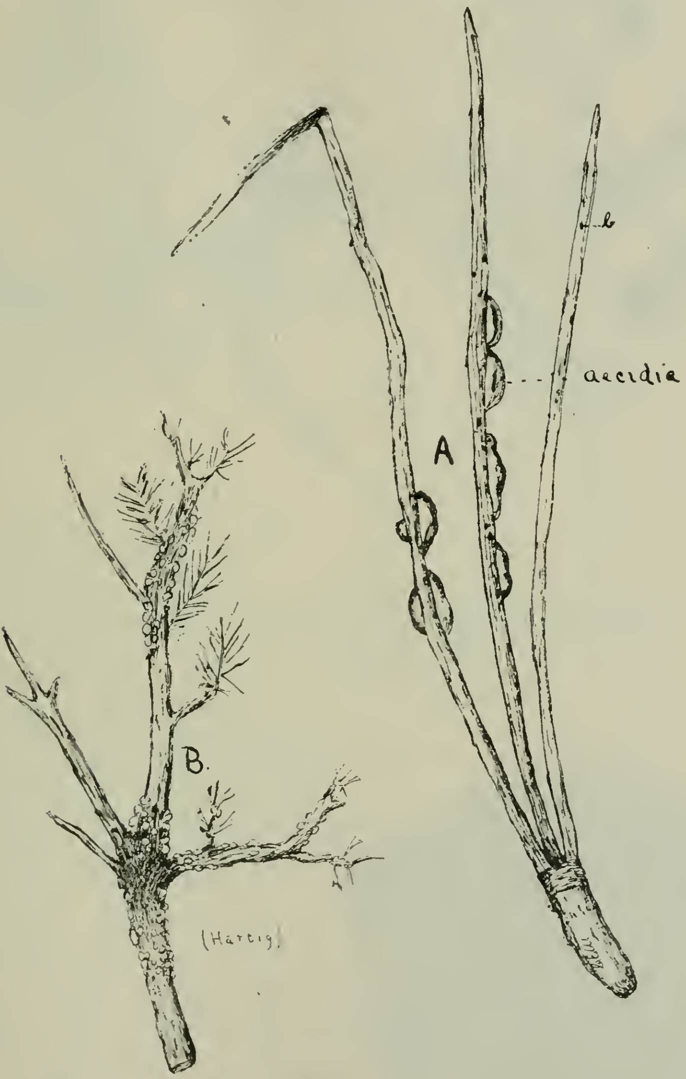


FIG. 18. *Peridermium pini* (Pine Cone Fungus). (a) Leaves of pine affected with this disease. The cluster cups occur as orange yellow blisters and contain the spores. Spermogonia (b) appear as black spots. (B) shows a branch which has been killed and which bears cluster cups. (After Massee.)

of bark are closed and oxygen is unable to get access to the interior cells. This loss of oxygen is of vital importance to the healthy working of the tree, and all shade and fruit trees should be kept well cleaned. Careful scraping will do much good, but perhaps the best remedy is the application of some strong caustic, such as whale oil soap (2 lbs. to a gallon of water in winter) or fungicide, as Bordeaux mixture.

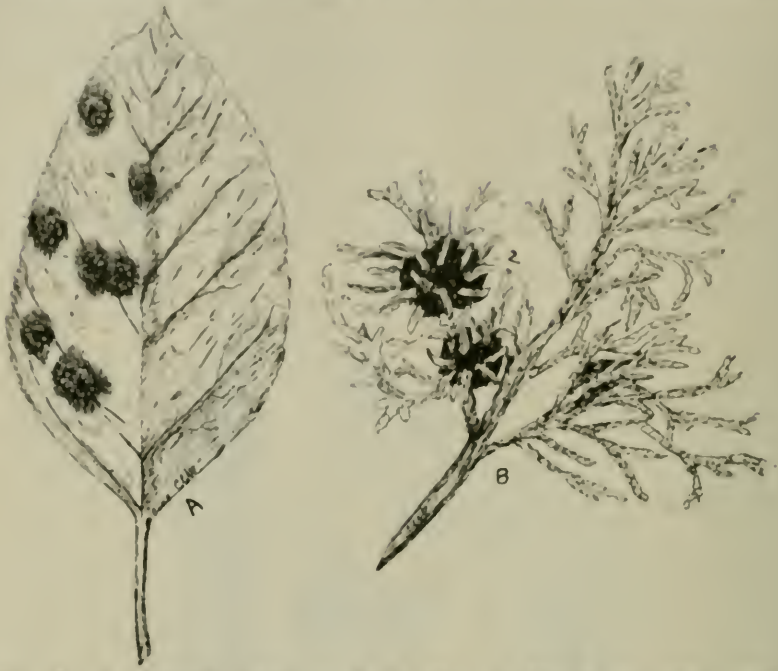


Fig. 19. A, *Roestelia pirata* on apple leaf: (1) aecidia or cluster cups containing aecidiospores. B, *Gymnosporangium macropus* (1) the cedar apple showing the yellow horns containing the teleutospores or winter spores.

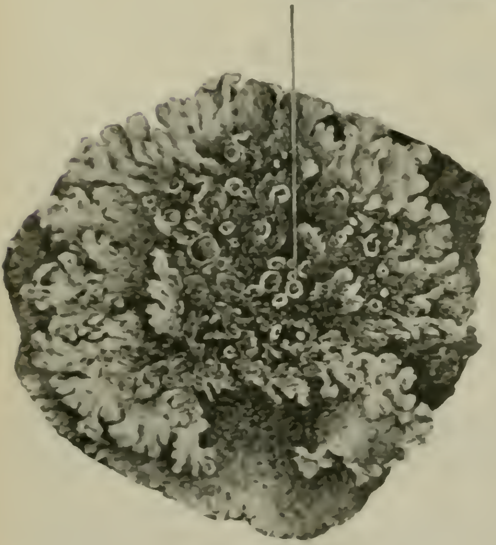


Fig. 20. Lichens.

3. Fungi affecting the Leaves.

(a) Maple Leaf Blotch (*Rhytisma acerinum*) (Fig. 21.) Frequently the upper surfaces of the leaves of maples contain large black patches of a fungus nature. These patches make their appearance in June, and are then yellowish in color, but a little later they turn black and thick, forming a sort of scab, due to the fact that the mycelium becomes hard and dense. During the winter, spores are produced in cavities called *asci*, and in the spring they become mature and are liberated. In this way the infection is carried to trees in the neighborhood.

The only practicable method of preventing the spread of this fungus is to gather up and burn the leaves before the spores are set free in the spring

(b) Pine Leaf-Cast (*Lophodermium pinastri*). (Fig. 22.) Sometimes the leaves of young, seeding pines fall prematurely, and, if the leaves are examined, small, oval, black spots may be seen. These are the masses of asci, each containing eight spores, which rupture only after long-continued wet weather. In some of the islands of the Muskoka lakes large areas of young pine trees were completely defoliated during the summer of 1899 by this fungus.

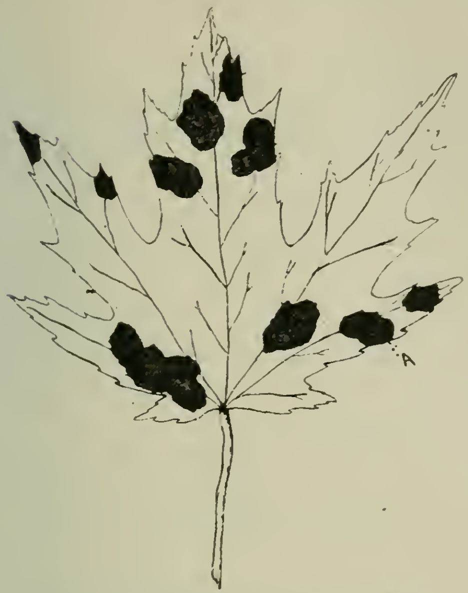


Fig. 21. *Rhytisma acerinum* (Maple Leaf Blotch) showing the sclerotium spots, (a) on a maple leaf. These sclerotia become wrinkled and contain the apothecia with the asci and spores. (Original).

No remedial treatment can be suggested for this disease, especially after the mycelium has gained an entrance to the inner tissues.

Summary.

Shade trees are liable to attacks from many quarters. Not only are insect enemies plentiful, but fungus enemies are even more abundant, and await the first favorable opportunity to make the attack. These opportunities come quite frequently during the life of an ordinary shade tree. They come when outside conditions are unfavorable to the healthy working of the organs of the tree, when, for example, the food supply is inadequate, the drainage poor, or the water supply extreme. The tree becomes weakened, and in its weakened state cannot ward off the host of invaders. Wounds brought on by storms of wind or hail, when portions of the bark are bruised, or branches torn off, form very suitable places for the entrance of both fungi and insects. In every case the old adage, "a stitch in time saves nine," holds true, and frequently a little labor at the outbreak will not only save a great amount of labor later on, but also, perhaps, the life of the tree.

The chief insect and fungus enemies of shade trees have been discussed as fully as space would permit, and it must be inferred that the enemies are numerous. The owner who takes great care of his trees—along the lines laid down in these articles—will be abundantly rewarded in seeing his trees "things of beauty and joys forever," while his careless neighbor will probably be lamenting his "hard luck." Shade trees must be treated as living, organic beings—fed with abundant nutritious food, and cared for by attending to their wounds—if they are to furnish that refreshing shade in summer, that peculiar beauty all their own, and that protection from the blasts of winter, which are so much to be desired.

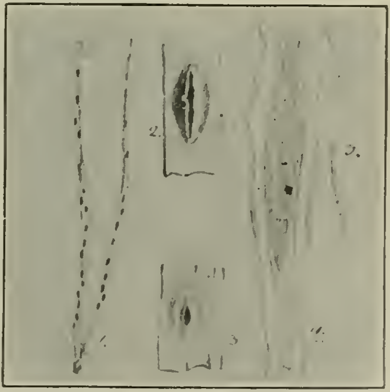


Fig. 2. *Lophodermium pinastri* (Pine-Leaf Cast (1) leaves with the fungus. Within the apothecia are the club-shaped asci which contain the spores. (After Massee).

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Tenth Annual Report

OF THE

Fruit Experiment Stations

of Ontario

UNDER THE JOINT CONTROL OF THE

ONTARIO AGRICULTURAL COLLEGE, GUELPH,

AND THE

FRUIT GROWERS' ASSOCIATION OF ONTARIO.

1903.

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THE ONTARIO FRUIT STATIONS.

	Name.	*Fruit.*	*Experimenter.*
1.	Southwestern	Peaches	W. W. Hilborn, Leamington.
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3.	Burlington	Blackberries and Currants	A. W. Peart, Freeman.
4.	Lake Huron	Raspberries	A. E. Sherrington, Walkerton.
5.	Georgian Bay	Plums	J. G. Mitchell, Clarksburg.
6.	Simcoe	Hardy Apples and Hardy Cherries	G. C. Caston, Craighurst.
7.	Bay of Quinte	Apples	W. H. Dempsey, Trenton.
8.	St. Lawrence	Hardy Plums & Hardy Pears	Harold Jones, Maitland.
9.	Strawberry Station		E. B. Stevenson, Arkwright.
10.	Maplehurst	General collection of all kinds of fruits for descriptive work for "Fruits of Ontario."	L. Woolverton.
11.	Algoma	Hardy Fruits	C. Young, Richard's Land'g.
12.	Wabigoon	Hardy Fruits	A. E. Annis, Dryden.

FRUITS OF ONTARIO.

Described and Illustrated by Mr. L. Woolverton, Secretary of the Board of Control of the Ontario Fruit Experiment Stations.

Fruit growing has become so important an industry in the Province of Ontario, that it deserves every encouragement at the hands of the Department of Agriculture. The Canadian farmer who contemplates growing fruit asks for information on two points in particular, viz., (1) What fruits shall I plant, and (2) How shall I cultivate them? The latter of these questions it is the province of the Ontario Fruit Growers' Association to answer through the "Canadian Horticulturist" and the Annual Report, while the former question is one that can be solved only by years of patient experimental work by our fruit experiment stations.

Of equal importance is some means of identifying all varieties now grown in our Province, and of knowing with some degree of exactness the size, color, general appearance and real value of these varieties aside from the catalogues of the nurserymen. To meet this latter need, the Secretary, with the advice and approval of the Board of Control has begun the work of illustrating and describing the fruits of Ontario; and in this work he desires to acknowledge the valuable aid of the various fruit experimenters. The illustrations are all new and original, having been engraved from photographs made the exact size of the fruit samples, except where otherwise specified, and in this way there will in time be made accessible to the Ontario fruit growers a complete guide to all the fruits grown in the Province. Such a work necessarily must be slow and tedious, but it is all important that it should be characterized by scientific accuracy, and the writer invites notes or criticism from pomologists generally.

APPLES

TRANSCENDANT.

An excellent early autumn variety of the hybrid crabs.

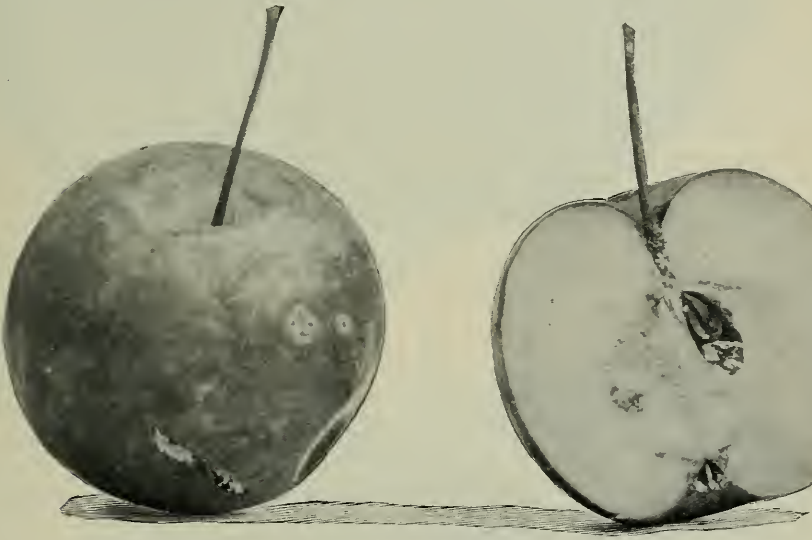
Origin : United States.

Tree : Of moderate slender growth, hardy, somewhat subject to twig blight.

Fruit : Size 1¾ inches long by 1 7-8 broad, which is medium for its class ; form roundish oblong, flattened at ends, ribbed ; color of skin golden yellow, with crimson cheek and thin whitish bloom ; stem one and a quarter inches long, set in an open deep cavity ; calyx closed, segments large, set in a hollow, slightly corrugated basin ; somewhat subject to scab.

Flesh: Color yellowish ; texture crisp and moderately firm ; flavor acid, slightly astringent, becoming pleasant when fully ripe.

Season : August and September.



Transcendant.

COLVERT.

A fairly good fall market apple, being large in size and rather attractive in appearance, but of fair quality. It has been widely planted in Ontario for market. For kitchen use it is much inferior to the Gravenstein.

Origin : Uncertain.

Tree : Very vigorous and very productive.

Fruit : Large, 3 x 3½ inches ; form oblate, slightly conical ; skin greenish yellow, with cheek and faint stripes of dull red ; stem stout, half an inch in length.

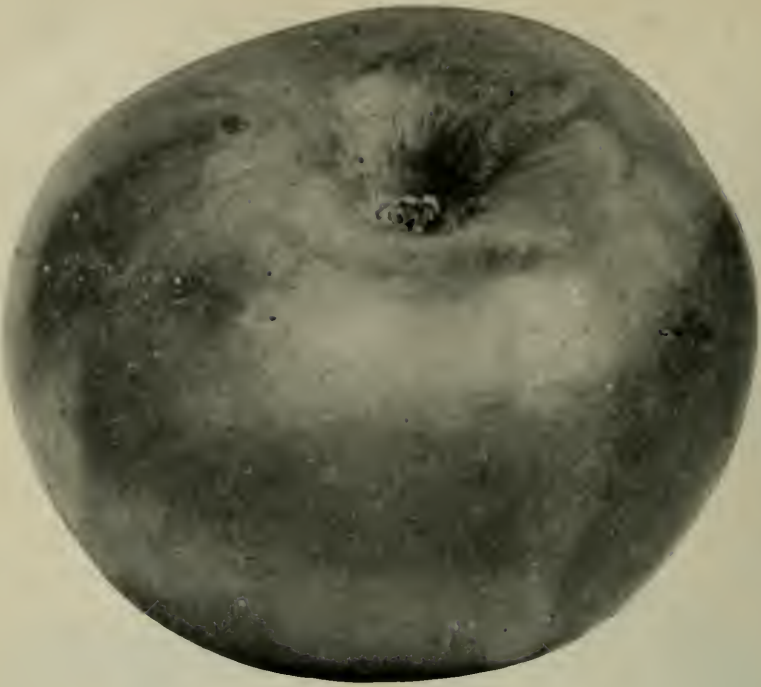
Flesh : Color greenish white ; texture tender, moderately juicy ; flavor sub-acid, ordinary.

Season : October to November.

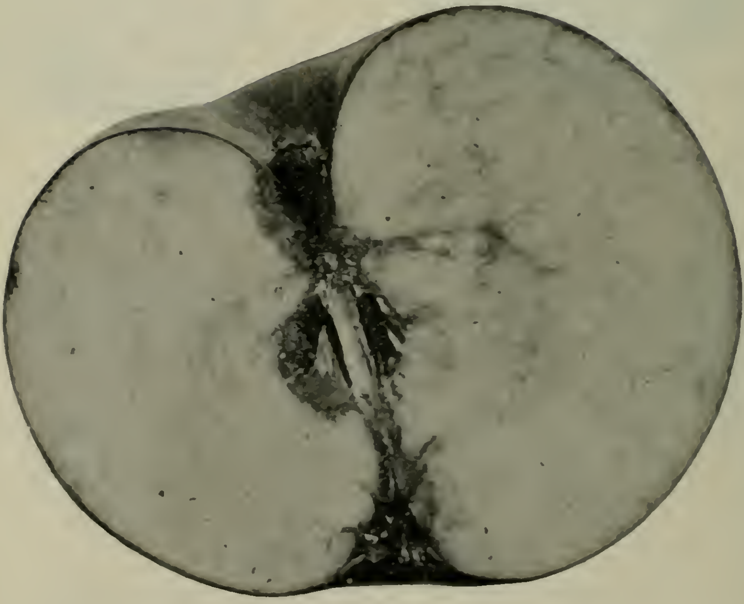
Quality : Dessert, fair ; cooking, good.

Value : Second grade for market, as compared with Gravenstein.

Adaptation : Succeeds at Georgian Bay and Bay of Quinte stations, and is widely grown in the older apple sections of Ontario.



Colvert.



Section of Colvert.

[6]

FALLAWATER.

Fallawater.

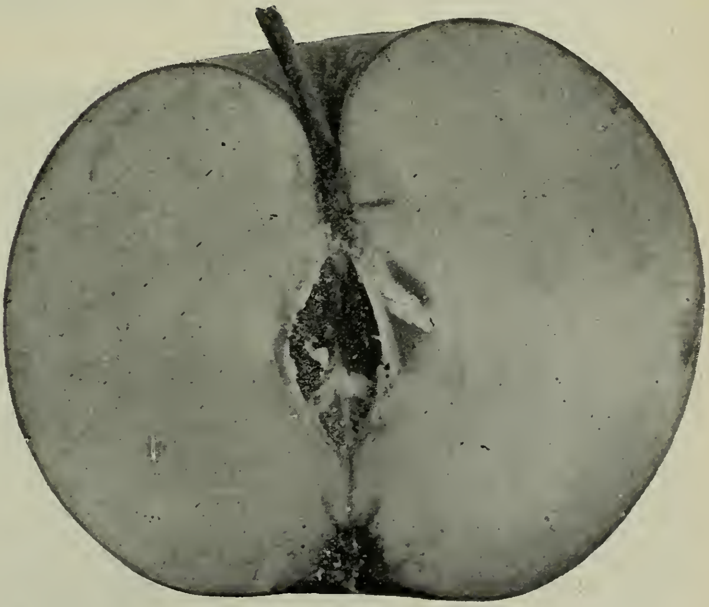
A large apple, of even size and fine appearance, which is grown for market quite extensively in Pennsylvania, Ohio, and in some of the Western States, and to some extent in Ontario. Were it more uniformly productive, we could recommend it as a profitable commercial variety.

Origin: Pennsylvania.

Tree: A vigorous grower ; fairly productive.

Fruit : Size large 3 x $3\frac{1}{2}$ inches ; form round, regular, smooth ; color pea green, shaded on sunny side with brownish red cheek dots sparce, large light green ; stem half an inch long, stout set in a narrow, moderately deep cavity ; calyx small, nearly closed, set in a shallow wrinkled basin.

Flesh: Greenish white ; texture fine-grained, firm, moderately juicy ; flavor mild subacid, fair.



Section of Fallawater.

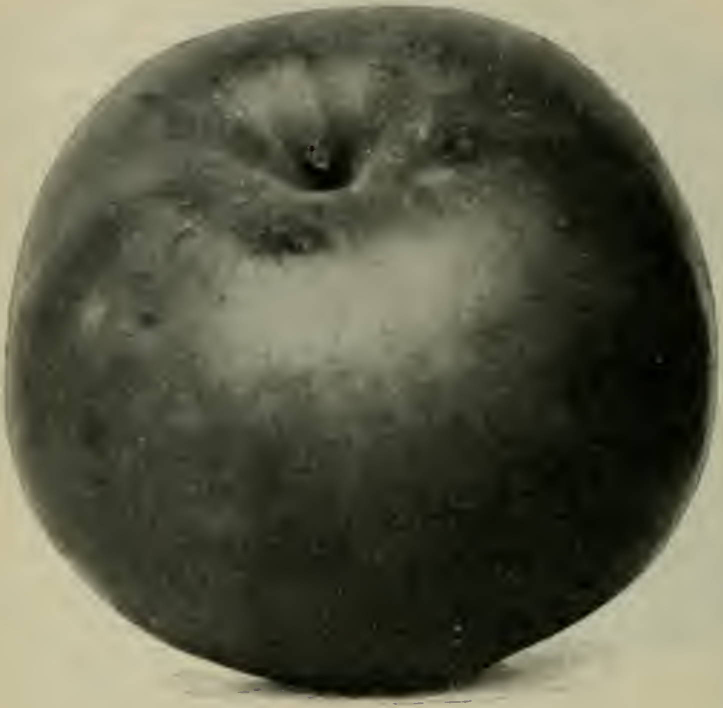
Season : January to March.

Quality : Fair for cooking.

Value : First-class.

Adaption : Successfully grown at our Bay of Quinte station and all parts of the Province farther south ; also in the Lake Huron district, but in some localities it is said to be short-lived.

HUBBARDSTON. (*Hubbardston's Nonsuch.*)



Hubbardston.

A first-class commercial apple for early winter. It succeeds well in the Province of Ontario, and deserves to be planted much more freely.

ORIGIN: Hubbardston, Mass.

Tree: Hardy, vigorous and very productive.

Fruit: Size, medium to large, attaining a diameter of three inches and three-quarters in length by three and a quarter in width; form round ovate, fairly regular; skin rich yellow ground nearly covered with stripes and splashes of light rich red; stem three-quarters of an inch long, set in a narrow deep russetted cavity; calyx open in a ribbed basin.

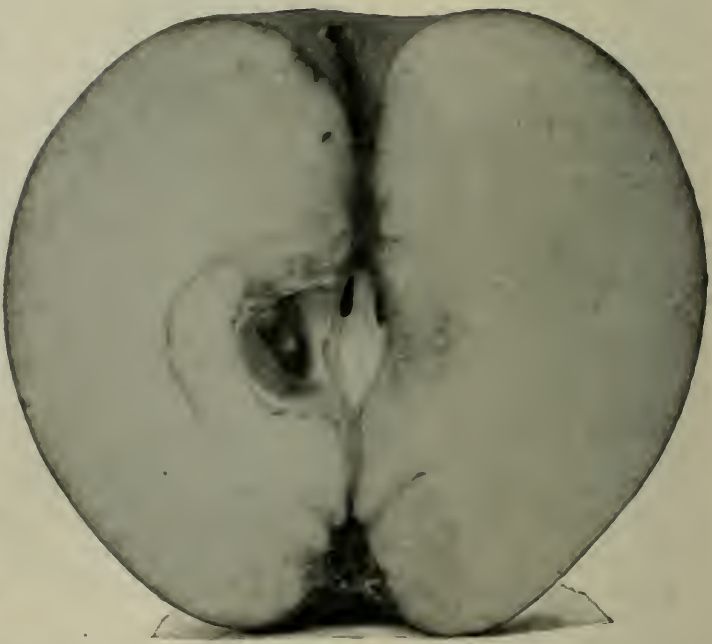
Flesh: Texture tender and juicy; flavor subacid, rich, sweet and excellent.

Quality: Very good.

Value: Market first-class.

Season: October to February.

Adaptation: Reported successful in the Counties of Simcoe Prince Edward and Norfolk.



Section of Hubbardston.

HYSLOP.

A well known and widely cultivated variety of hybrid crab. Its dark, rich, red color and its late season make it a valuable variety.

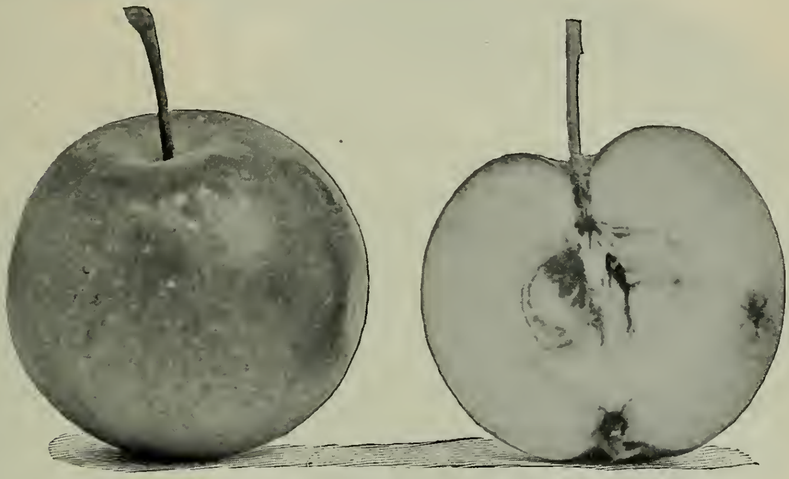
Tree: Vigorous, of spreading habit.

Fruit: Size 1¾ inches by 1 7-8; form roundish ovate, obscurely angular; color a dark rich red, covered with heavy blue bloom, and having many obscure yellowish dots; stem about one inch and an eighth in length, set in an obtuse, regular cavity.

Flesh: Yellowish, acid.

Season: September and October.

Value: Very good for culinary uses and for cider.



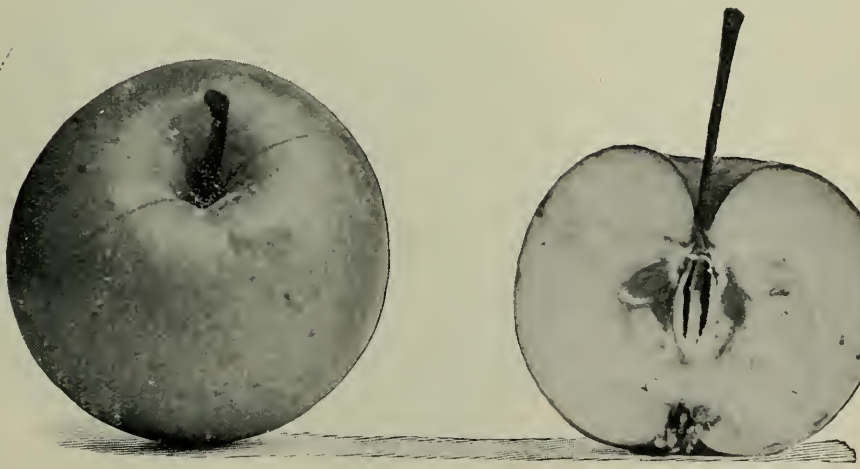
Hyslop.

ORANGE.

A fairly good dessert variety of hybrid crab.

Origin: United States.

Tree: A slow grower, productive.



Orange.

Fruit : Size medium, 1½ inches by 1¾ ; form round, slightly flattened at the ends ; color light orange, with minute white dots and russet veins ; stem slender, 1¼ inch in length, set in a deep open cavity ; calyx closed, in a furrowed basin.

Flesh : Color yellowish, yellow veinings ; texture a little dry ; flavor mild, pleasant, acid.

Season : September.

PHOENIX.

Phoenix.

A fairly profitable commercial apple in some parts. It is grown in Northumberland county and in some other apple sections in the Province, and by some growers is ranked equal to the Baldwin for profit.

Origin : Illinois.

Tree : Healthy and productive.

Fruit : Medium to large, measuring 2½ x 3 inches ; roundish, sometimes quite one-sided ; color greenish yellow ground well covered with deed red, obscurely striped with a darker shade, and having a few small grey dots ; russetted about the cavity and green about the basin ; stem ½ inch long in a funnel shaped cavity ; calyx half closed.

Flesh : Creamy-white, coarse grained, somewhat juicy ; flavor mild, acid, pleasant.

Quality : Dessert, poor, cooking, good.

Value : Very good for export, if shipped early.

Season : December to February.

Section of Phoenix.

GRAPES.

BRIGHTON.

The fine size of its bunches and the excellence of its flavor as a dessert grape gave promise, in its first introduction, that the Brighton would be a popular commercial grape in Ontario; but in this we have been disappointed, because of its susceptibility to mildew, and its poor shipping quality. The latter point is of importance to our Ontario fruit growers, who look forward to the great Northwest as one of the best markets for the product of their vineyards. As a dessert grape the Brighton is worthy of a place in every fruit garden which is planted for home uses.

Origin: Raised by Jacob Moore, Brighton, N. Y.; a cross between Concord (Labr) and Diana Hamburg (Vinifera).

Vine: Vigorous; semi-hardy; productive; somewhat subject to mildew; leaves large, thick, dark green; pollen sometimes defective, and the vine should have other varieties which are good pollenizers planted near it.

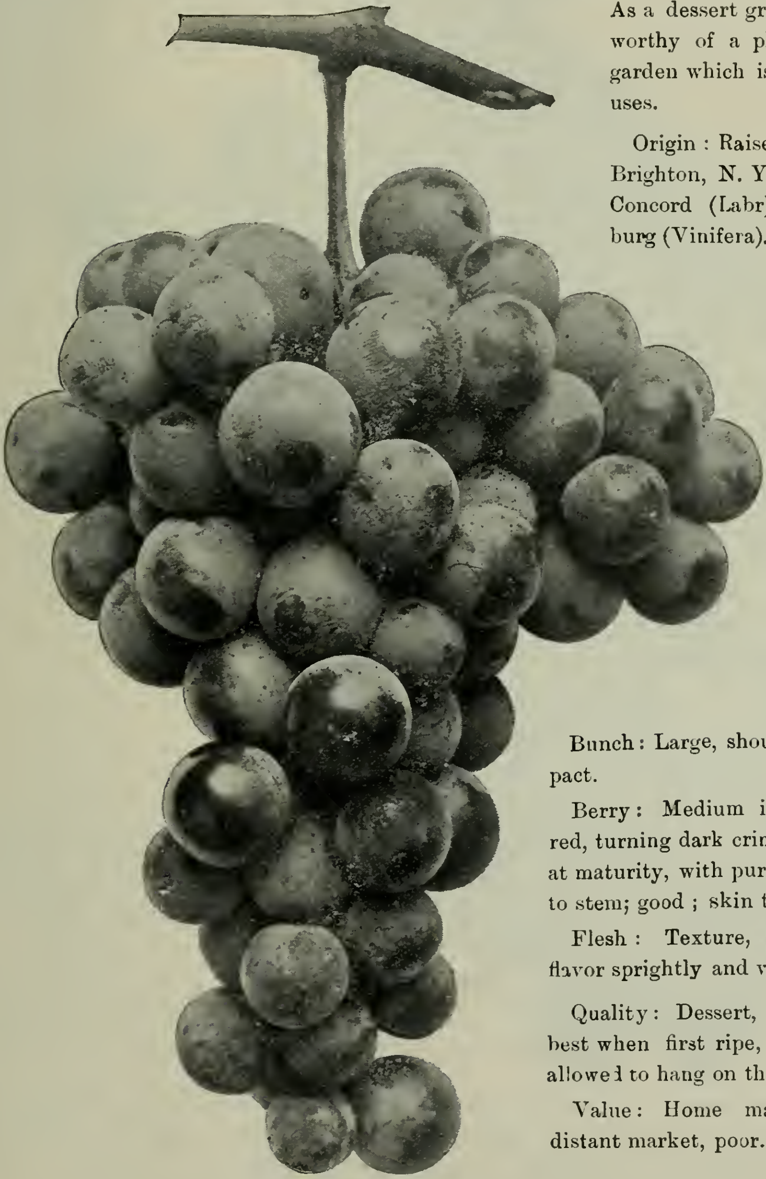
Bunch: Large, shouldered, fairly compact.

Berry: Medium in size; color light red, turning dark crimson or almost black at maturity, with purple bloom; tenacity to stem; good; skin tender.

Flesh: Texture, tender and juicy; flavor sprightly and very pleasant.

Quality: Dessert, very good, at its best when first ripe, but deteriorates if allowed to hang on the vine.

Value: Home market, very good; distant market, poor.

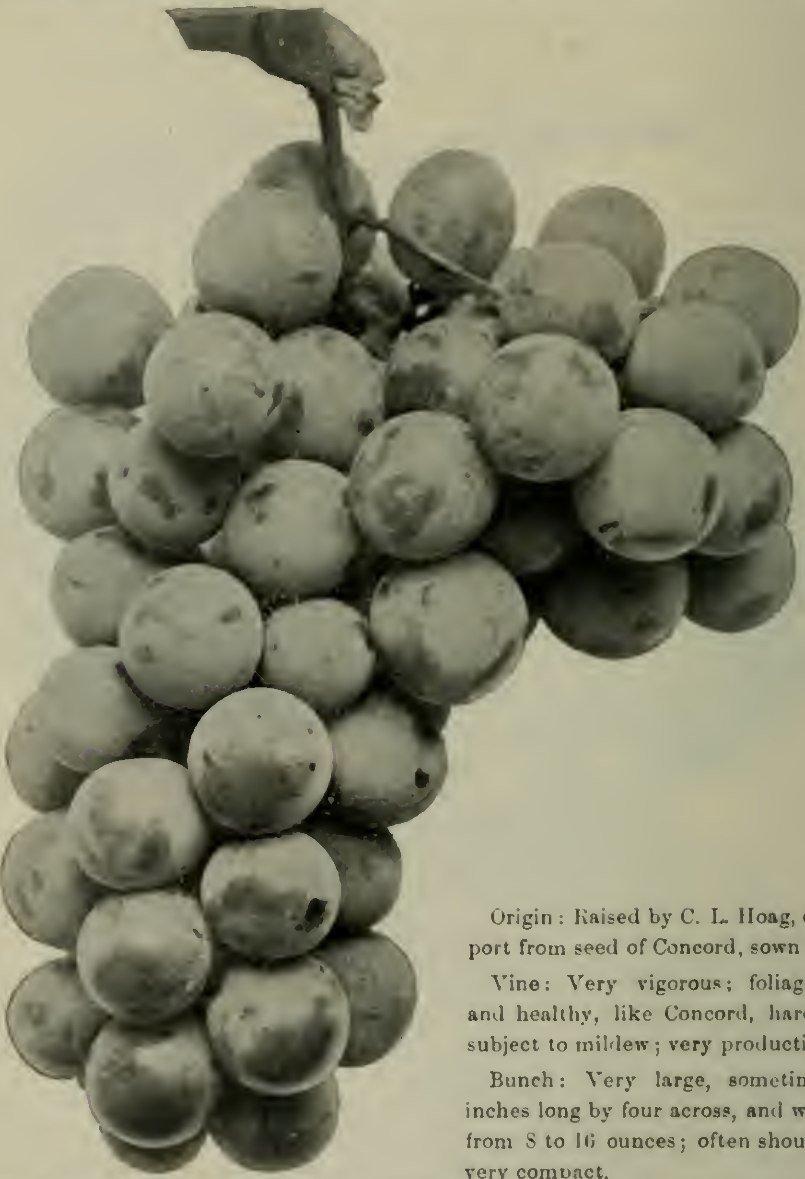


The Brighton Grape.

Season: September, with Hartford Prolific; not a long keeper.

NIAGARA.

The Niagara is the leading white grape in Ontario, for commercial purposes. In health, vigor of vine and in productiveness it has no superior, and it has been planted more widely than any other variety except the Concord. For dessert purposes it is good in quality when well ripened. We do not recommend it for sections north of Toronto, unless in favored locations.



Origin: Raised by C. L. Hoag, of Lockport from seed of Concord, sown in 1868.

Vine: Very vigorous; foliage thick and healthy, like Concord, hardy, not subject to mildew; very productive.

Bunch: Very large, sometimes six inches long by four across, and weighing from 8 to 16 ounces; often shouldered; very compact.

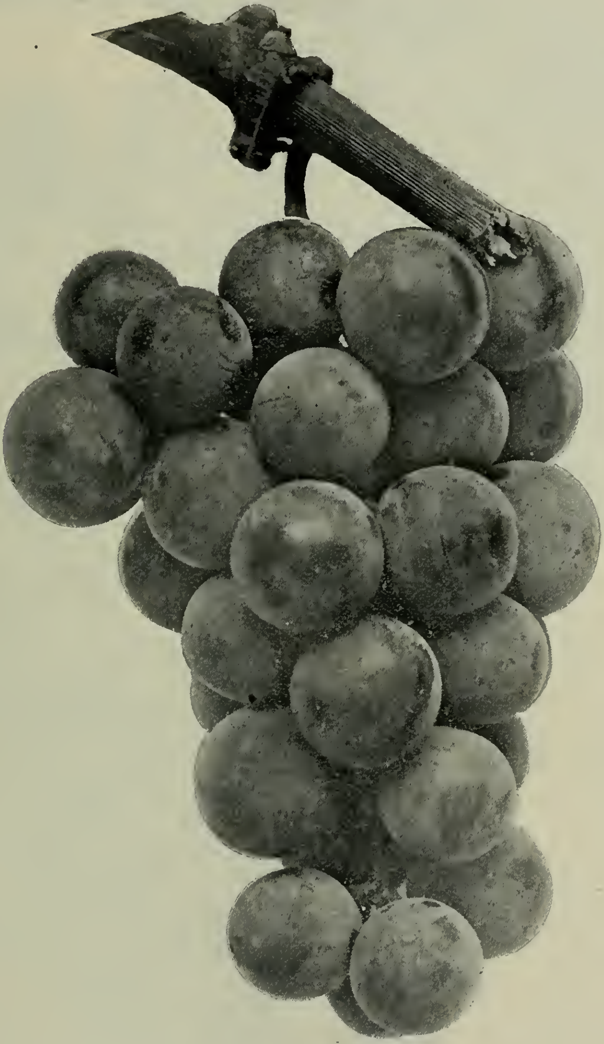
Berry: Round, about the size of Concord; pale green turning to pale yellow at maturity, and covered with a thin whitish bloom; skin tough and not inclined to crack; pulp soft, juicy and sweet, of good flavor when fully ripe, with a touch of muskiness.

Quality: Dessert, good; canning very good.

Value: Home markets, first-class.

POCKLINGTON. (Golden Pocklington.)

This grape was first shown at the New York State Fair, Rochester, in 1877, and was at that time considered the largest and finest white grape of purely native origin, and was largely planted for commercial purposes. However, since the introduction of the famous Niagara, the Pocklington has been almost lost sight of, and is very little planted.



Pocklington.

Origin: A seedling of Concord, raised by John Pocklington, Sandy Hill, N.Y.

Vine: Of medium vigor; moderately productive; healthy, resisting mildew and rot; of Labrusca (Concord) parentage.

Bunch: Size, 4 1-2 x 3 inches, with small shoulder, fairly compact.

Berry: 1 13-16 of an inch in diameter; round; color pale green, turning golden yellow; flesh pulpy, but tender and fairly juicy; flavor sweet, somewhat foxy; drops from stem after gathering.

Quality: Dessert,, fair.

Value: Home market, fair; distant market, poor.

Season: End of September and October; about a week later than Concord.

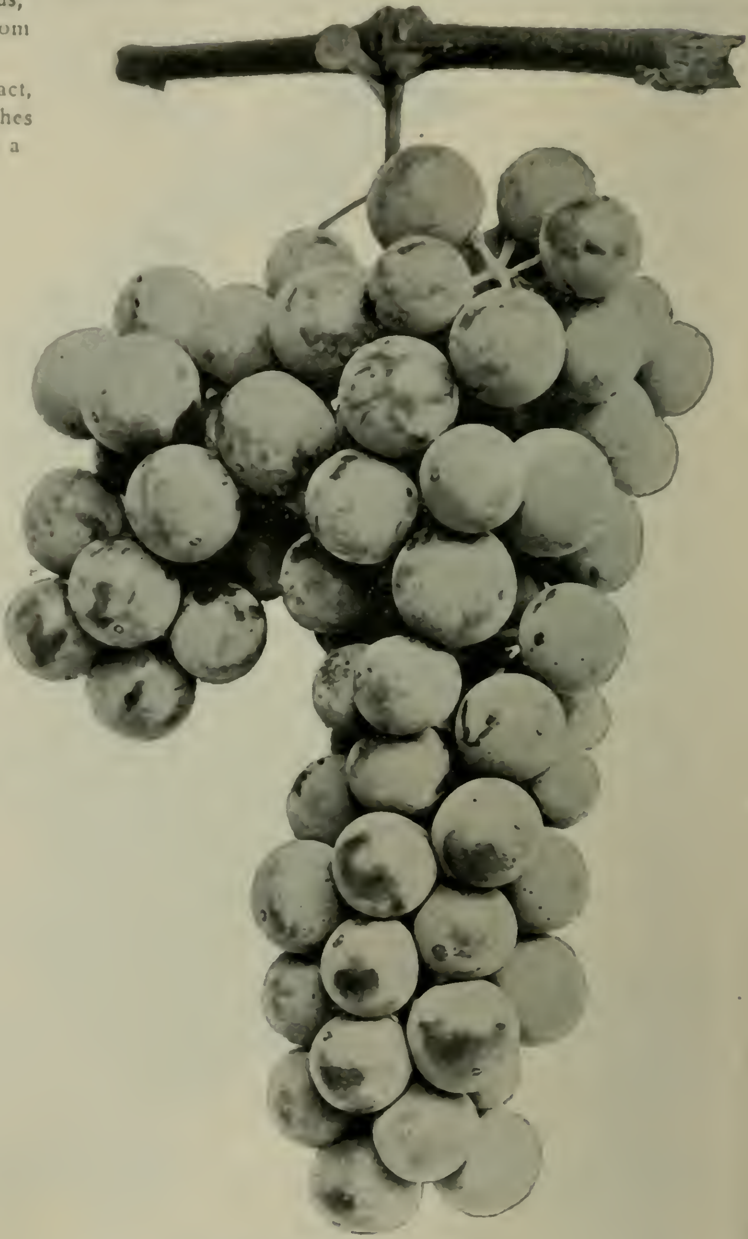
TRANSPARENT.

Valuable in Ontario only as a wine grape.

Origin: Seedling of Taylor, by Jacob Rommell, of Missouri.

Vine: Vigorous, productive, free from mildew and rot.

Bunch: Compact, shouldered, six inches long by three and a half broad.



Transparent.

Berry: Firm, round; diameter, 5-9 of an inch; color, pale greenish yellow, transparent, with thin grey bloom; skin, thin; pulp, tender, juicy; flavor, fine and sweet.

Season: End of September.

Adaptation: Southern sections of the Province.

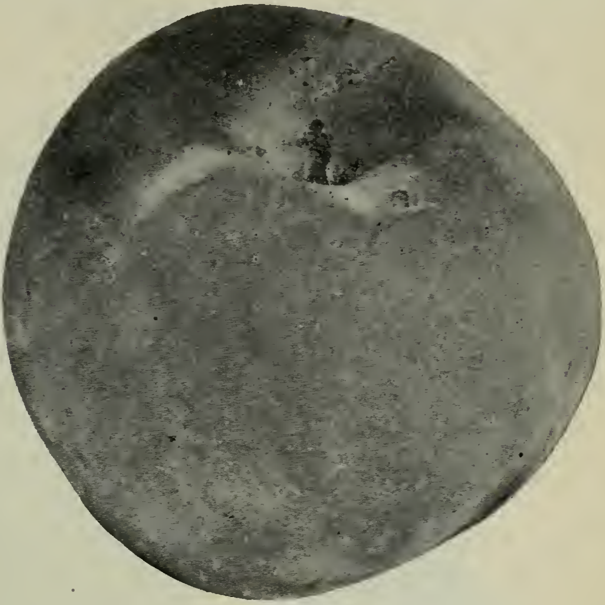
PEACHES

LEMON CLING.

A large and showy peach, at one time planted freely in Ontario peach orchards, but of late discarded because of its cling stone.

Origin: South Carolina.

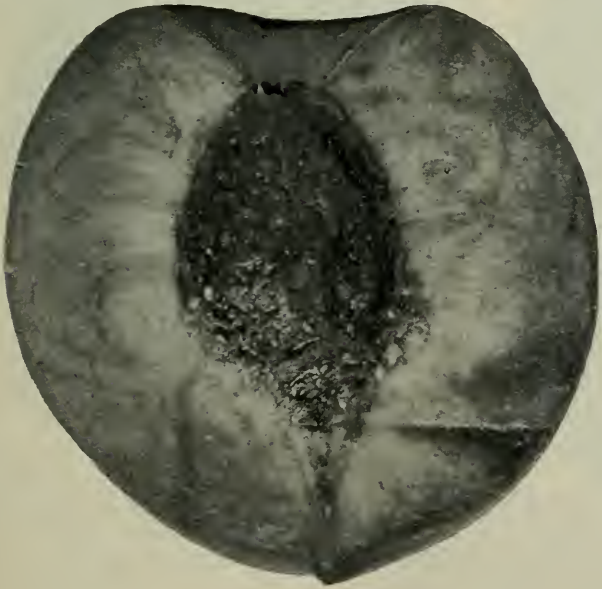
Tree: Vigorous, hardy and productive.



Lemon Cling.

Fruit: Size, large, 3 1-2 x 3 inches; form, roundish, narrowed towards apex, which is large and prominent, somewhat like that of the lemon; skin, deep yellow, with a dark brownish-red cheek.

Flesh: Color yellow, tinged with red at the pit; texture firm, not very juicy; flavor pleasant, sprightly, sub-acid.



Section of Lemon Cling.

Season: Last half of September.

Quality: Dessert, fair; cooking, fair.

Value: Market, fair.

PEARS

GIFFARD.

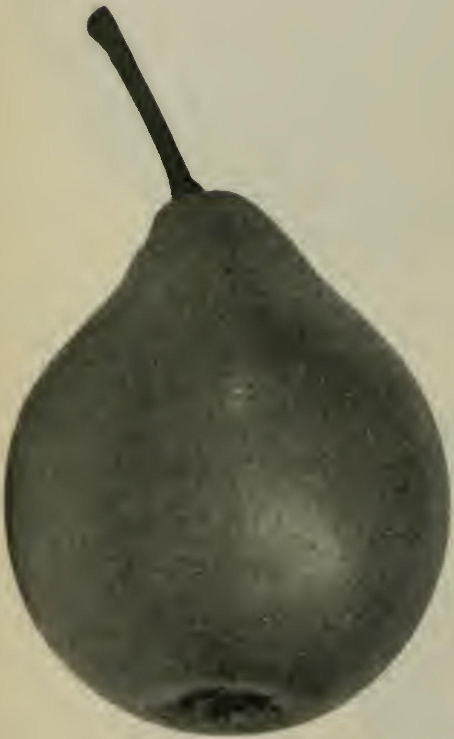
(Beurre-Giffard.)

A very desirable commercial pear for the home market.

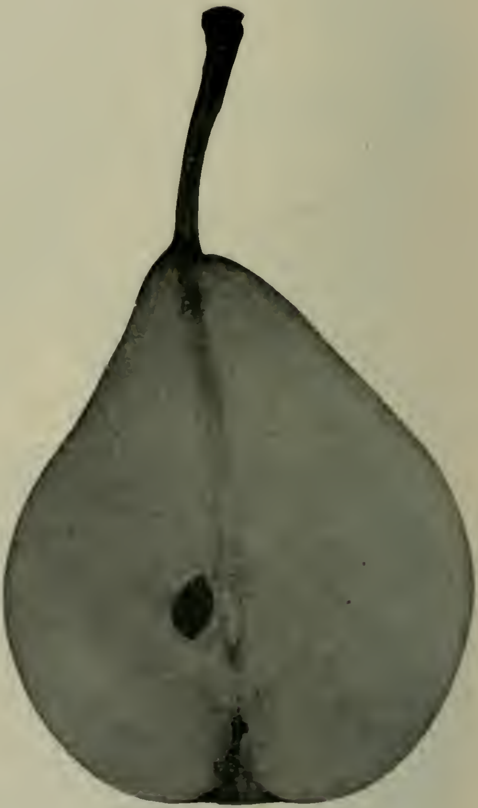
Origin: A chance seedling about 1840, in the garden of M. Giffard, Angers, France.

Tree: Fairly vigorous; a straggling grower; healthy; fairly productive.

Fruit: Size, medium to large, 3 1-2 x 2 1-2 inches; form pyriform conical; color light green, with red dots and marbling of red on the sunny side; stem one inche long, stout, swollen at the base, set obliquely; calyx half closed, in small, shallow basin.



Giffard.



Section of Giffard.

Flesh: Color white; texture melting, juicy; flavor, vinous, perfumed.

Quality: Dessert, very good; cooking, best.

Value: First-class for home market.

Season: August 10th to 15th ((1902).

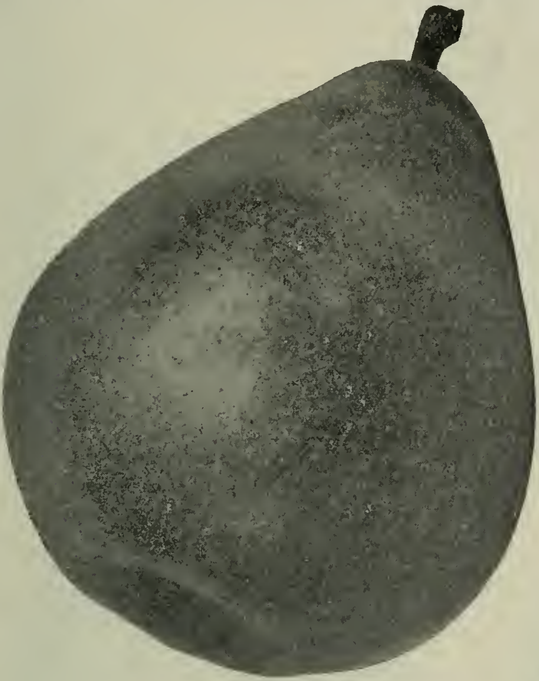
GOODALE.

A very good late fall pear ; ; promising as a market variety.

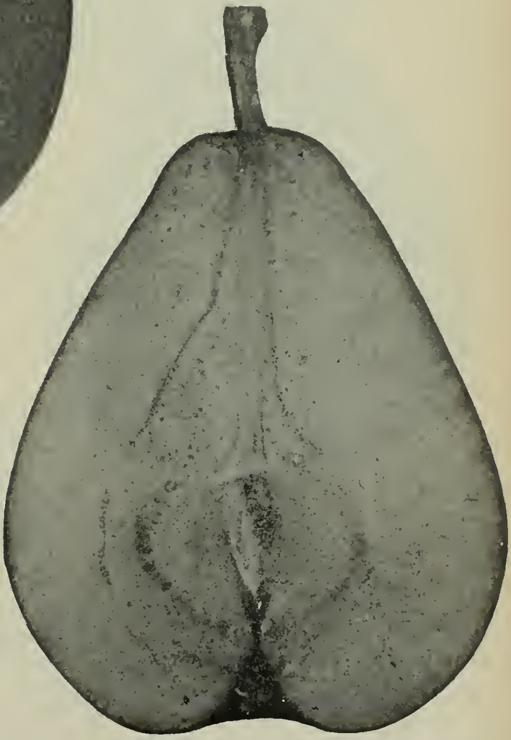
Origin : Seedling raised by F. Goodale, Saco, Maine.

Tree: Very vigorous and hardy and uniformly productive.

Fruit : Large, obovate obtuse pyriform ; color green, yellowing at maturity, with crimson cheek, some russet patches, and some small brown dots ; stem about 5-8 of an inch long, set in an inclined cavity ; calyx small, closed, in a small, rather deep basin.



Goodale.



Section of Goodale.

Flesh : Color white ; texture fine, juicy, granular at core; flavor sweet, pleasant, perfumed.

Quality : Good.

Value: Dessert, fair ; market, good.

Season : October.

OSBAND.

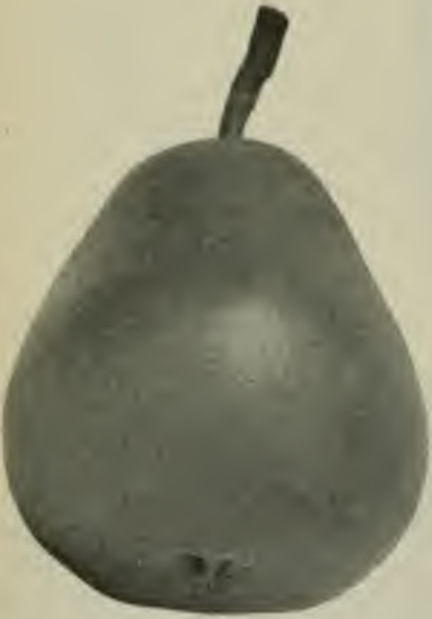
(Osband's Summer.)

Widely grown in North America. A good dessert pear for home garden, but the fruit is small and the tree too scant a bearer to be profitable.

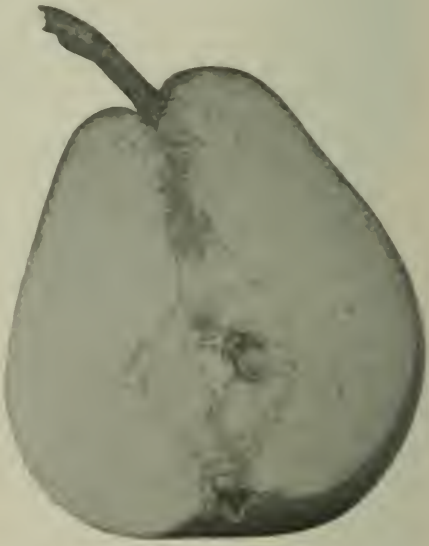
Origin: Wayne County, New York State.

Tree: A moderately upright grower, healthy, fairly productive, an early bearer.

Fruit: Size, 2 x 2 1-4, sometimes averaging 1 1-2 x 2; form obovate, slightly pyriform, regular; color yellowish green, turning quite yellow at maturity, with a brownish red cheek, and numerous small green and brown dots; stem, 7-8 of an inch long, set in a small, abrupt cavity; calyx half open, in a broad, slightly depressed basin; core small; seeds small.



Osband.



Section of Osband.

Flesh: Color white; texture fine-grained, juicy; flavor perfumed, sweet, rich and pleasant.

Quality: Dessert, very good; cooking, fair.

Value: Home market, fair; distant market, poor.

Adaptation: Southern Ontario.

Season: 10th to 20th of August.

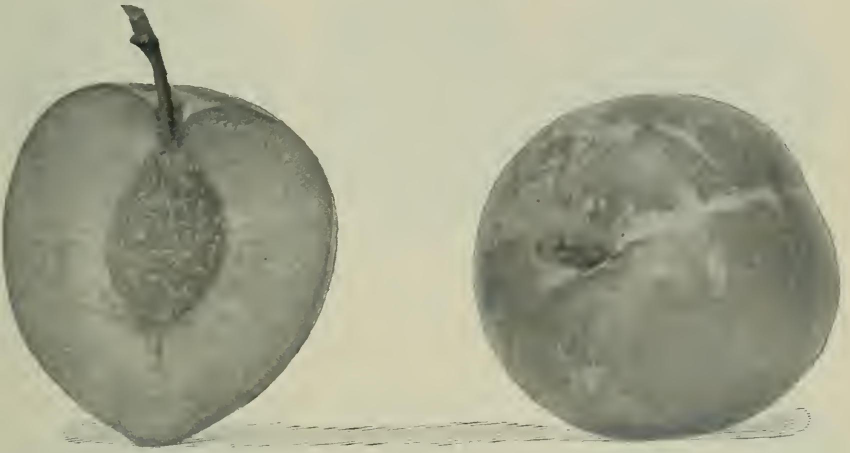
PLUMS

CHABOT. (Yellow Japan. Bailey.)

This is the best Japan plum of its season, which is about two weeks later than that of Burbank.

Origin : Imported from Japan by Mr. Chabot, of Berkeley, Cal., and introduced to the trade by Mr. Luther Burbank in the year 1896.

Tree : Very vigorous, forming a fine, large, symmetrical head ; productive ; an early bearer ; hardy.



Chabot.

Fruit : Medium to large for a Japan plum ; 1-8 x 1-2 ; form, oblong-conical, almost heart shaped ; color, red, with pinkish bloom and numerous minute yellowish specks ; stem 3-4 inch long, stout ; apex a point in a narrow, deep depression ; suture traceable ; very attractive in appearance.

Flesh : Color yellowish ; texture moderately firm and juicy ; flavor sweet, perfumed, very pleasant ; clings to stone.

Season: September 1 to 15 (1902).

Quality : Dessert, good ; cooking and drying, very good.

GREEN GAGE.

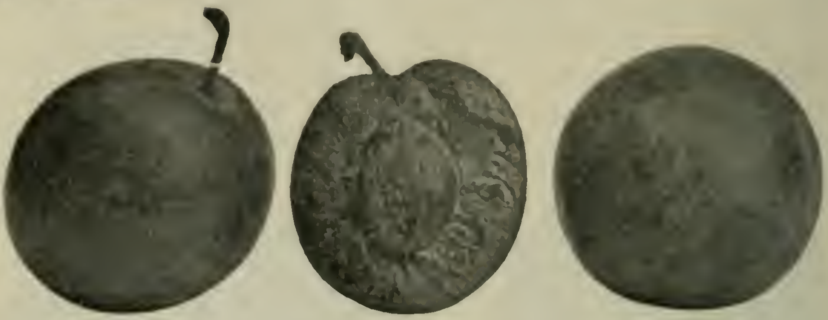
The Green Gage and several varieties of the same type are of especial value for culinary purposes. For pies, sauce or canning purposes, they seem to be growing in demand year after year, and no collection of plums for the home garden is, therefore, complete without a tree or more of this or some other variety of this family. With Ontario fruit growers, the most popular Gage is the Reine Claude de Bavay, commonly known among them as Reine Claude, which name is also an old synonym of the Green Gage. In the catalogue of the American Pomological Society it is called Bavay. The fruit of this latter variety is in good demand among canners, and brings a fair price in our markets.

Origin : This type of plum was brought from Italy to France about the year 1500 by Queen Claudia, wife of Francis I., after whom it was named Reine Claudia. Later, some trees were brought to England by a family named Gage, but the label on these trees being lost, the gardener called them Green Gage. Hogg, the English pomologist, however, tries to prove that this plum had been introduced into England before this time under the name of Reine Claude, and hence arose considerable confusion of names.

Tree : Productive ; hardy, a slow grower.

Fruit: Roundish; size medium; skin greenish, yellowing towards maturity, with a thin whitish bloom and a few red dots; stem three-quarters of an inch long, set in a small, abrupt cavity; suture traceable.

Flesh: Color pale green; texture melting and juicy; flavor, rich, sweet and excellent; pit mostly free.



Green Gage.

Quality: Cooking or canning, best; dessert, very good.

Value: Home market, good.

Season: Middle to end of August

GUEII (Blue Magnum Bonum).

A valuable plum for the commercial orchard, probably the best of its season; planted quite generally for market in the southern parts of the Province.

Origin: With Mr. Hagaman, Lansingburgh, N.Y., about 1850. It was named after John Goeway (pronounced Gueii), who was the first to cultivate the plum extensively, and it has of late been spelled after the pronounciation.

Tree: An upright, vigorous grower, becoming more spreading with age; hardy; an early and abundant bearer.

Gueii.

Fruit: Size, medium to large; 1 5-8 x 1 5-8; form, roundish ovate, narrowing slightly toward apex; color, very dark purple, with blue bloom; stem, 1 1-2 inch long, slender, set in a large, deep cavity; suture very slight; apex a small point.

Flesh: Color pale yellow; texture firm, juicy; flavor, moderately sweet, pleasant; almost free of stone.

Quality: Dessert, fair; cooking, very good.

Value: Home market, very good.

Season: End of August to first week of September.

Adaptation: Succeeds well at Burlington.

PURPLE EGG (Hudson River Purple Egg).

A good commercial variety, especially for preserving.

Origin : On the banks of the Hudson River, New York State, exact locality not known.

Tree : Upright, vigorous grower, hardy and very productive.

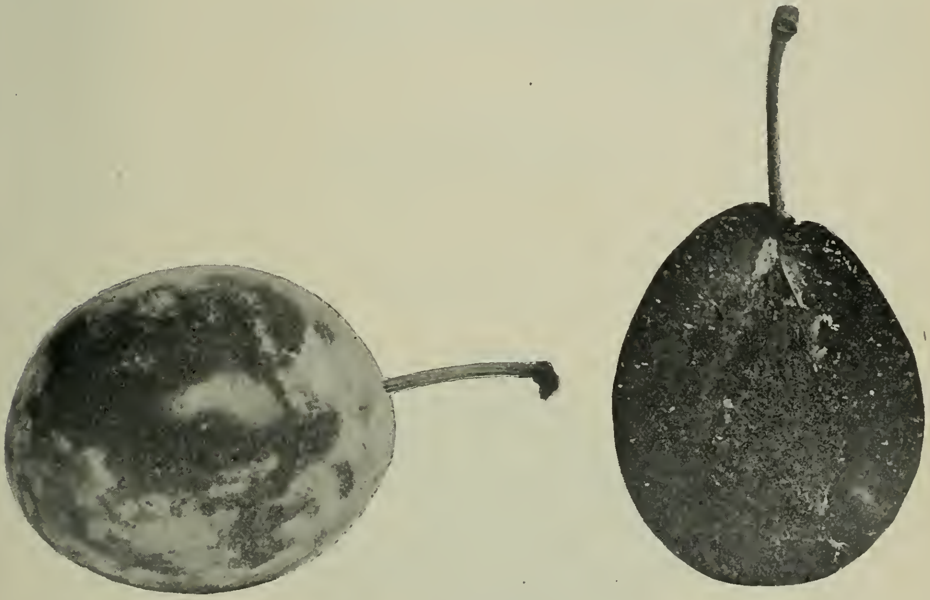
Fruit : Size large ; form ovate, often necked ; color of skin, dark, rich red to purple: stem long in a deep cavity ; suture shallow ; bloom thin ; clings to stone.

Flesh : Color, greenish yellow : texture firm ; flavor brisk acid.

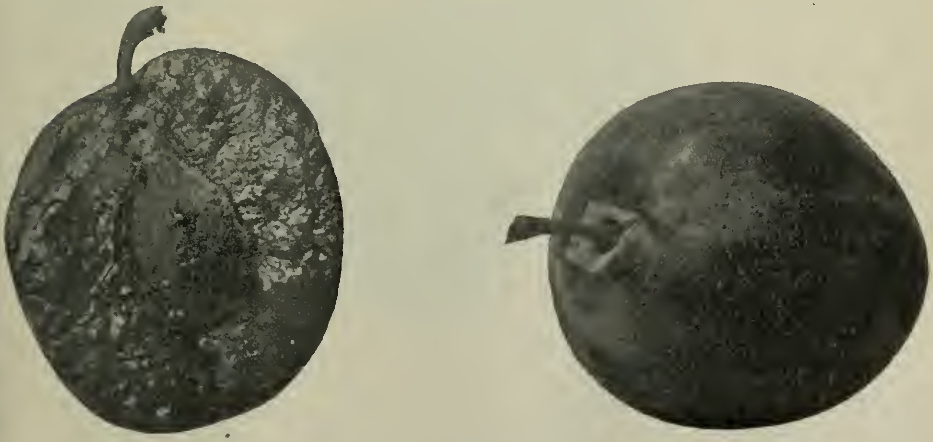
Quality : Dessert, poor ; cooking, very good.

Season : Last half of September.

Adaptation : A success in Niagara district, at the Burlington and Georgian Bay stations.



Hudson.



Washington (Reduced).

WASHINGTON.

Not productive enough, nor good enough a shipper to be popular in the commercial plum orchard; but, on account of its large size, beauty and excellence of quality, a universal favorite for the dessert table.

Origin: New York City, as a sucker from a grafted tree, which was purchased from a market woman by a Mr. Balmer He first fruited it in 1818, and the plum was at first called Balmer after him.

Tree: A strong, vigorous grower; fairly productive; foliage, remarkably large, broad and glossy.

Fruit: Size large; form round oval; suture traceable, very distinct near the stem; color full yellow, changing to deep yellow, marked with crimson dots and covered with pale bluish, grey bloom; stem three-quarters of an inch long, set in a wide, shallow cavity

Flesh: Yellow; texture firm; flavor rich, sweet and luscious

Quality: Dessert, very good; cooking, very good

Value: Home market, first-class

Season: End of August

RASPBERRIES

SMITH'S GIANT.

A very promising black raspberry for the commercial plantation.

Origin: With A. M. Smith, fruit grower, St. Catharines, Ont.

Plant: Vigorous, fairly hardy and quite productive.

Fruit: Very large, black, with heavy bloom.

Smith's Giant.

Quality: Dessert or cooking, very good.

Value: Market, one of the best.

Season: Late, July 15th to August 1st.

Adaptation: Tested at Burlington, Walkerton, Guelph, and Craighurst, and found hardy.

FRUIT RECOMMENDED TO ONTARIO PLANTERS.

APPLES.

List of the Most Valuable Varieties.

Summer.

Red Astrachan : Adapted to all sections except the extreme north.

Duchess :Adapted to all sections.

Fall.

Gravenstein : Adapted to all sections except the St. Lawrence River district and other northerly portions of the Province.

Wealthy: Particularly valuable for northern sections.

Alexander : For northern sections.

McIntosh : Adapted especially to the St. Lawrence River district, but can be grown over a much wider area.

Fameuse : Adapted especially to the St. Lawrence River district, but succeeds well over a much wider area.

Blenheim : Adapted to all sections except the St. Lawrence River district and other northerly portions of the Province.

Winter.

King : Adapted only to the best apple sections, and succeeds best when top grafted on hardy stocks.

Hubbardston : Adapted to the best apple sections.

Greening : Adapted to the best apple sections.

Cranberry : Requires good soil and is adapted to the best apple districts, but especially southern Ontario.

Baldwin : Succeeds best on clay land, and is adapted to the best apple districts.

Northern Spy : Adapted to the best apple districts, but can be grown with success further north by top grafting on hardy stocks. This is also a good method of bringing it into early bearing.

Ontario : An early and abundant bearer, but short lived. Recommended as a filler among longer lived trees. Adapted to same districts as Northern Spy, which it somewhat resembles.

Stark : Adapted to best apple districts.

Varieties Especially Adapted to Home Use.

Summer.

Yellow Transparent : Adapted to all sections.

Primate : Adapted to best apple sections.

Sweet Bough : Adapted to best apple sections.

Duchess : Adapted to all sections.

Fall.

Chenango : Adapted to best apple sections.

Gravenstein : Adapted to best apple sections.

Wealthy : Especially adapted to northerly sections.

McIntosh : Especially adapted to northerly sections.

Fameuse : Especially adapted to northerly sections.

Blenheim : Adapted to best apple sections.

Winter.

King: Adapted to best apple sections. Should be top grafted.

Wagener: Adapted to best apple sections.

Swayzie Pomme Grise: Adapted to all sections except most northerly.

Greening: Adapted to best apple districts.

Talman Sweet: Adapted to best apple districts.

Northern Spy: Adapted to best apple districts, but will succeed further north if top grafted.

Mann: Adapted to best apple districts, but will succeed further north if top grafted.

Summer: Yellow Transparent, Charlamoff.

Hardy Varieties Recommended for Sections North of Latitude 46 degrees.

Summer: Yellow Transparent, Charlamoff.

Fall and Winter: Duchess, Wealthy, Hibernal, Longfield, Patten's Greening, Whitney Crab, Hyslop Crab.

Fruit Experiment Stations

REPORT OF THE INSPECTOR.

By Prof. H. L. Hutt, Ontario Agricultural College, Guelph.

I have the honor of presenting my tenth annual report of the work of the Fruit Experiment Stations.

In the first place, I may say I am pleased to report good work on the part of the stations. We have been fortunate in securing in our experimenters a number of the best informed fruit growers of the Province, nearly every man of whom is a specialist in some particular line; therefore the reports which they are making from year to year are of inestimable value to the farmers and fruit growers of this country.

All of the stations were visited this year with the exception of the "Pioneer Farm," at Wabigoon, where the fruit plantation is only nicely being started. Each station was visited as nearly as possible at the most opportune time for seeing the fruits especially under test. I was thus on the go at various times throughout the summer from the time the strawberries were ripe in June till the apple harvest in October.

Bird's eye view of W. H. Dempsey's orchard and home, Trenton, Ont.

For my own information, I took notes of the leading varieties as grown at each station, but as this is information which should come directly from the experimenters, I have left it to be dealt with in their reports.

By the use of my camera during the past two seasons, I have been able to get a number of excellent photographs at each of the stations which may be of use to illustrate the reports of the experimenters. A liberal use of these in our annual report should add much to its value, for often a good photograph conveys as much to the average reader as a page of print.

The past season was, on the whole, an excellent one for fruit, and most of our experimenters were favored with abundant crops. At a number of stations many new varieties are coming into bearing, which will afford interesting material to report upon. One of the difficulties which many of our experimenters are experiencing is to be sure that the trees or plants of these new varieties are true to name. Already I have come upon quite a number which were not what they were obtained for. In Mr.

Dempsey's collection of apples, where he has already 400 varieties on his list, and is adding new ones every year, this is a matter which requires much careful attention. The authorities in connection with the Department of Agriculture at Washington have kindly offered assistance in matters of this kind, which we are pleased to accept. This fall Mr. Dempsey and I collected samples of about fifty new varieties which have lately begun fruiting there, and forwarded them to Washington for verification, but as yet I have not heard from Mr. Dempsey as to their report upon them.

In reporting this season I have thought it hardly necessary to go into details of the work of each station, as that has been done repeatedly in previous reports, so I shall refer to those only which call for special mention.

One of the most remarkable apple crops seen in my travels this year was in Harold Jones' orchard at Maitland. Many of his Snow and Scarlet Pippin trees were literally crushed to the ground with the weight of fruit, notwithstanding all his efforts to keep them up with ropes and props. The quality of the fruit was exceptionally fine. Nowhere else have I seen such fine Snows as are grown in that section. In this connection I may say that the more I travel the more I am convinced that the question of varieties is very much a local one after all. In proof of this I need only refer to the particular adaptability of the Ontario apple as seen in Trenton, the Blenheim at Burlington, the Cranberry at Grimsby, the Baldwin in Essex, and the Duchess in Simcoe and the North. There are, of course, some varieties which have a much wider range than others, but to meet the demand for the best quality we must ascertain as definitely as possible the particular varieties best adapted to each section.

View in M. Pettit's Vineyard, Winona. Grape rows half a mile long.

The question as to how long it is advisable to continue testing varieties which show no particular signs of promise is one we should come to some definite conclusion upon and advise our experimenters accordingly. For instance, at our gooseberry station at Nantyr, it has now been pretty well settled by five or six years' repeated tests that the English varieties of gooseberries, which are so much prized wherever they can be grown free from mildew, are almost a complete failure there, notwithstanding all Mr. Spillett's efforts to keep them free of mildew.

Would it not now be advisable to try a few of the leading English and American varieties at some of the other stations where the conditions are quite different, as at Burlington, Walkerton, and St. Joseph Island?

In Mr. Pettit's experimental vineyard at Winona, where over a hundred new varieties of grapes have been under test for several years, it is quite evident that very few of these much-lauded new kinds are worthy of further trial there or anywhere else in Ontario. It would be as well now to root out these worthless kinds to make room for more extensive planting of those kinds which have proved their value, and for other new ones which should be given a trial.

The excellent results which have been obtained with various kinds of fruits at the Algoma Station on St. Joseph Island have been a surprise to many. At that particular point the soil is very fertile, the atmosphere quite humid, and the rainfall frequent, all of which contribute to make this the "Emerald Isle of the North." The strawberry finds there the ideal conditions for growth, and because of the few grown it is a most profitable crop. From a little patch of about a quarter of an acre Mr. Young cleared this year about $200. The berries were so large that eighteen filled a box, and they all sold for 10c per box right in his own village.

The cherries were an abundant crop. Most of the apple trees also were heavily loaded, and some of the plums are quite promising. So far the codling moth and plum curculio have not yet made their appearance on the island.

The surprising results already obtained at this station tend to show what can be grown in sections of Algoma and Muskoka wherever the local conditions are favorable. There are, however, many sections in that northern country where the climatic conditions are not nearly so favorable as on St. Joseph's Island, and for this reason I think it would be advisable to establish another station where further tests could be made under more trying conditions. A station in the Temiskaming District, where so many new settlers are now going in, would probably afford the other extreme, and if started at once would no doubt prove a great saving of time, money and effort to the people of that rapidly growing section.

Agawam and Eldorado Blackberries as grown at G. C. Caston's, Craighurst, Ont.

FRUIT CONDITIONS IN NEW ONTARIO.

At a meeting of the Board of Control, held at the Industrial Fair grounds on Wednesday, September 9th, 1903, it was agreed that it is desirable that a fruit testing station be opened in the district above North Bay, possibly at New Liskeard, and it was ordered that the Secretary of the Board, Mr. L. Woolverton, and the Secretary of the Ontario Fruit Growers' Association, Mr. G. C. Creelman, be a committee to investigate the whole question.

Subsequently it was decided to send Mr. Harold Jones of Maitland, to this northern country to examine fruit conditions there and report to this Board. The following is his report:

Maitland, Sept. 30th, 1903.

To the Board of Control. Gentlemen:

Following instructions form the Board of Control of the Fruit Experiment Stations to study the conditions and possibilities of fruit growing in New Ontario, with the object in view of establishing an experiment station in that section, I arrived at North Bay on September 21st. The next morning I went directly north for a distance of [illegible] miles, on the Government railroad, now being constructed.

Beyond the first two or three miles north of North Bay, the road passes through an unbroken forest of Spruce, Balsam, Cedar, Pine, Birch, Maple, and a little Basswood.

On this railway, at Trout Lake, Sturgeon River, and on the south side of Moose Lake, wild plums grow successfully, also pin cherries, chokecherries, raspberries, blueberries, gooseberries, elderberries, strawberries, and high bush cranberries.

Chas. Young's experimental apple orchard at Richard's Landing, St. Joseph's Island, Algoma.

The land varies greatly, from rocky ridges (granite) to sand, gravelly loam and clay loam. The most of this section, as far as soil conditions are concerned, will undoubtedly be adapted to fruit growing when the forest is cleared away.

This section of the country is at a high elevation. Sturgeon Lake, about 25 miles north of North Bay, is about 1,200 feet above sea level, and 600 feet above North Bay.

I understand that portions of this forest I have just mentioned are reserved by the Government as a timber reserve, and so will not be open to settlement for some time.

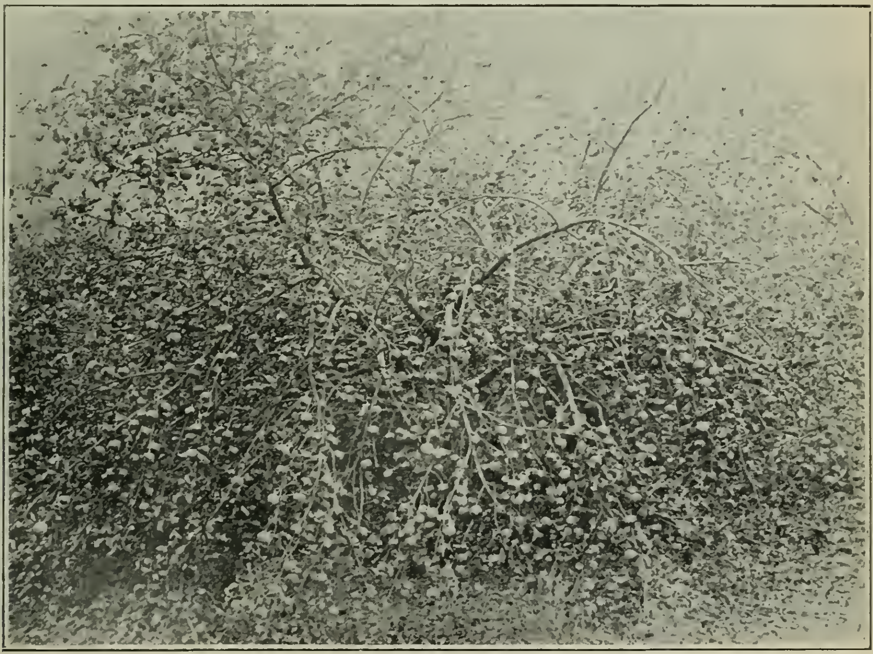
On September 22nd I took the train to Mattawa, a point on the Ottawa River, east of North Bay. From there I went by rail 39 miles up the banks of the Ottawa, to the foot of Lake Temiskaming, from which point I went to New Liskeard, a distance of 85 miles, on one of the Lumsden Company's steamers.

The banks of the Ottawa and of Lake Temiskaming, as seen from the train and steamer, are abrupt cliffs, mostly of a rocky formation, covered with Soft Maple, Silver Birch, Poplar, Balsam, Spruce, and Pine, with some Burr Oak. These cliffs are rich in scenic gradeur, but very little, if any, fit for cultivation.

At Haileybury, six miles south of New Liskeard, the rocky formation abruptly stops, and we enter into the great clay belt of the north, which is said to be 600 miles long, of about 200 miles wide, and of unknown depth.

I stopped over night at New Liskeard, a thriving little town of 1,000 or 1,200 inhabitants, who have great expectations.

The next morning, September 24th, I drove out on the East Road, along the north end of the lake, for a distance of six miles. I found the land here all clay, with the exception of two limestone ridges.



Northern Spy Tree at W. H. Dempsey's, Trenton.

My first stop was at S. S. Ritchie's, five miles east of Liskeard, whose land is on the banks of the lake. This farm is a rather high elevation above the lake, and upon examining the soil in a cellar, that had been dug for a dwelling, I found it sandy for a few inches, with a clay to gravelly sub-soil, which would give good natural drainage. At this place I found a Hyslop Crab, and what was evidently a Duchess about four years old, in a healthy, thriving condition. The natural forest on this farm is deep-rooted, and there was no evidence of root-killing, even in varieties of apples that he had planted that were not hardy in wood and branch in that northern country.

I also visited C. W. Tucker, adjoining Ritchie, with soil conditions similar to those just mentioned. Here I found a Hyslop Crab, a good-sized apple of Russian origin bearing fruit, and Concord and Niagara grapes. Concord were ripe, Niagara green. I also found two native plums of excellent quality in full bearing.

I returned to New Liskeard for dinner, and after dinner drove towards White River and Tomstown, on what is known as the North Road. With the exception of two ravines, this country is a flat bed of solid clay, covered with a forest of small growth of Spruce, Balsam, and Cedar. The clay is covered to a depth of from three to ten inches with muck and decaying vegetable matter. The forest is growing with its root system spread out in this surface soil, and when the roots are turned the clay is left beneath as smooth as a slate.

Ten miles north I visited a gardener, by the name of Mackewen. I found him with a very good showing in potatoes, roots and grain, but he had not attempted any trees. I examined his well, and found the water level only 17 inches below the surface, which condition is very general along this road.

The next morning I drove out on the West Road to Milberta, a distance of 13 miles from New Liskeard, passing through the same clay, with the exception of one limestone ridge. On this road, however, I found more ravines, which gave better facilities for draining. I walked down one ravine about one hundred feet deep, with a small creek in the bottom, and looked in the riffles in the creek bottom for evidences of sand, and found none. The banks were the same fine clay all the way down. There are no trees planted by the settlers in this section, with the exception of a few on two farms set out this spring.

Orchard and home of J. G. Mitchell, Clarksburg.

A man named Doughty, on the road to Spring Lake from the West Road to Liskeard, had two McIntosh apple trees root-killed last winter. His soil is sand from eight inches to a foot, sub-soil, clay. Tetofsky blossomed and bore fruit. McIntosh blossomed and died in July.

John Martin, nine miles on the West Road, has planted apple and cherry trees, but his land is such that the trees will have no chance to make a root system.

Frank Atkinson, Milberta P.O., has a high location between two ravines. Conditions are favorable here for success with artificial drainage.

S. B. Bisby (postoffice New Liskeard), Henwood Township, 22 miles northwest of New Liskeard, who has a high location, soil a little sand, over loamy clay, no heavy clay down for two feet, has some birch, deep rooted. Possibly this land will give good natural drainage, and Bisby is an enthusiast, and feels sure that he can succeed with fruit.

On the Haileybury Road, south from New Liskeard, on the lake shore, a man by the name of Hawksworth has some apple and plum trees, and had one Wealthy in bearing.

Weather conditions seem favorable for the growing of all kinds of crops, and there is no evidence of severe frosts up to this date, corn being still green in most sections. In the winter months the thermometer falls as low as 40 degrees below zero, with the usual snowfall of about 2 1-2 feet, the ground often freezing to a depth of 2 feet. This country is evidently north of the belt of heavy snowfalls, such as they have along the north shore of lakes Superior and Huron.

Picking Cuthbert Raspberries at A. E. Sherrington's, Walkerton, Ont.

Taking into consideration the limited amount of clearing done, I think the wisest course your Board can adopt is to start a system of co-operative experiments in fruit, sending a few trees of varieties, hardy at Ottawa, to the men I have mentioned above, with instructions as to the planting and care, asking them to report results from year to year to the Board. Then in two or three years' time, if the Board sees fit to send their representative again to the country, he will be able to judge intelligently as to the best locality for an experiment station, and also as to the fitness of the man for the work who may be chosen as experimenter.

All of which I humbly submit.

Harold Jones.

INDUSTRIAL FAIR.

The usual large and instructive exhibit of fruit was made at the Industrial Fair during the past season. Each experimenter set up his own exhibit, but the whole was under the charge of Mr. W. M. Orr, of Fruitland; while Mr. A. M. Smith, an honorary director of the Ontario Fruit Growers' Association, and one of our best pomologists, was engaged to identify varieties and discard those which were incorrectly named.

Mr. Smith reported as follows:

R. L. Huggard, Whitby: 67 plates apples, 61 plates pears, 10 plates plums, 1 plate peaches; total 139. Many inferior samples, and 9 or 10 wrongly named.

Harold Jones, Maitland: 47 varieties of apples and crabs, 7 varieties of pears. A good many poor varieties shown.

W. H. Dempsey, Trenton: 153 varieties of apples: mostly good samples, and good varieties, and true to name.

M. Pettit, Winona. 66 varieties of grapes; mostly good samples, all true to name.

A. E. Sherrington, Walkerton: 66 varieties of apples and plums; true to name, and mostly good samples.

W. W. Hilborn, Leamington: 6 varieties of plums, 26 of peaches, 40 plates in all; some duplicates.

John S. Mitchell, Clarksburg: 110 varieties of plums and apples, some of them duplicates; 120 plates in all. Kinds true to name.

A. M. Smith.

At a meeting of the Board of Control, held on the Fair grounds on the 9th of September,, 1903, it was resolved that in future the experimental exhibit from each station be subdivided into at least two classes: (1) Those desirable for planting in the section represented, and (2) those proved to be undesirable; and that these two divisions be plainly labelled.

At the same meeting of the Board it was ordered that Messrs. Creelman, Orr and Hutt be a committee from this Board to advise with the committee from the Ontario Fruit Growers' Association, with regard to a special building for the use of the experiment stations; (1) for demonstrations in horticultural methods; (2) for an educational exhibit of varieties, and (3) for lectures on horticultural topics.

Ordered that this Board advise a continuous exhibit of fruit from the stations, providing proper installation, can be obtained, and that provision be made for demonstrations in packing and in other horticultural methods.

Also ordered that a limited number of glass jars be provided for preserving tender fruits for this exhibition.

GENERAL NOTES BY EXPERIMENTERS.

G. C. Caston (Simcoe Station).

This season has been a favorable one for nearly all kinds of fruits, the exceptions here being cherries and plums, and to some extent strawberries, which were injured in the early part of the season by dry weather. Raspberries did fairly well, and blackberries bore an abundant crop.

Early apples, such as Duchess, were not as good as last year, this being their off year; fall apples were plentiful, and of first-rate quality. Winter apples were a good crop, and of better quality than usual. The fungus scab was conspicuous by its absence this year. Nearly all apples, with the exception of Snows, which were slightly affected, were clean and bright. Even in orchards where no spraying is ever attempted, the fruit this year was clean. I attribute this to the dry, cool weather that prevailed through the early part of the summer. And just here a question arises that is often discussed, viz., What weather conditions are the most conducive to the propagation and spread of the fusicladium, or fungus scab? Different opinions are held as to this matter, as also with reference to the rust on wheat, which is a fungus of a similar nature. In my opinion precisely the same conditions apply to both, viz., the presence of excessive moisture and heat, without wind or any air currents. We find that trees that are well pruned, far apart, and more especially on rolling land, bear the cleanest fruit, which goes to prove the truth of this assertion; also the opposite conditions prevailing this year resulting in a clean, bright crop of apples. All this seems to me conclusive proof that my opinion is correct. And the lesson to be learned is that to have the finest apples, we must plant trees farther apart, and on rolling land, if possible. Also that we must prune regularly, and spray early and persistently, keeping the surface of bark and leaves and fruit covered with Bordeaux mixture until the danger is past. Thus we may secure fruit of good quality in an unfavorable season.

A much larger percentage of apples were of higher grade than perhaps ever before, but great difficulty was experienced in getting a supply of barrels and these were sold at famine prices, which becomes a serious charge in the way of expenses, and reducing the net price of the fruit considerably.

This year goes to show that the question of fruit packages is a live one, and the fruit growers are—to use a common phrase—up against it. It was a fine year for spraying, there being no rains to interfere, and although unsprayed orchards apparently had as clean fruit as those that were sprayed, yet the check trees in my own orchard showed a very decided difference. We must continue to spray if we are to have good fruit. A season like this comes but seldom. The old favorite, the Northern Spy, fairly excelled itself this year in this section. Wherever there was a Spy tree it was loaded with fruit, and the quality was first-class. We can never have too many Spys. They are all wanted, and more than we can supply.

A. W. Peart (Burington Station).

The fruit crop here has been heavy. Quality, too, has been above the average. Insects and fungi were not so troublesome as usual. The season has been somewhat peculiar—a 'dry, warm May, followed by a cool, damp summer, and an autumn of high temperature, with little moisture. The general result was large fruit, and a good growth of wood. The wood of vines, bushes, and trees appears to be going into winter well ripened.

Apples probably gave as heavy a yield as in 1902. The quality, however, was better—fewer worms and less spot. It is difficult to account for the comparative absence of worms. Perhaps the presence of more parasitic insects, the more general use of burlap bands, and the heavy crop for two years in succession—all these may have been contributing factors in breaking the heart of the Codling moth; and while the summer conditions were rather favorable to the development of apple spot, those of the fall were contrary. A fungous parasite friendly to the apple grower appears to have worked silently, covering many of the black spots with bronze-like formations, thus destroying their growth, and rendering them harmless. This was very noticeable in the Greening, Baldwin, and King. It seemed, however, to have little affinity for the Snow, as it is as spotted as usual. Owing to the difficulty in securing barrels, boxes have been used much more freely than in past years.

The best commercial varieties for this district appear to be the Duchess, Ribston; Blenheim, King, Greening, Baldwin, and Spy.

Pears, with the exception of the Anjou and Sheldon, were a good crop, of fine quality. Their size was exceptional; the Bartlett, Flemish Beauty, Easter Beurre, Josephine, and Winter Nelis, being especially large and handsome. The Duchess was slightly spotted. Winter Nelis, Josephine, Easter Beurre, and Wilder are promising. For commercial planting, Clapp's Favorite, Bartlett, Duchess, and Anjou take the lead.

Plums were a heavy crop. The curculio did little damage, but there was considerable rot in some varieties. Of the domestic kinds, Lombard, Quackenbos, Bradshaw, Niagara and Reine Claude are the most grown; while the Abundance, Burbank, and Satsuma stand at the head of the Japans. The plum acreage, however, appears to be too wide for present conditions, the crop being handled this year with little, if any, profit.

Peaches were also a good crop. There was little or no leaf curl. The varieties chiefly grown are the Champion, Crosby, Elberta, Early and Late Crawfords, Smock and Tyhurst.

Cherries were only a moderate crop. Trees have made a good growth, the season being much more favorable than last year, when several young Montmorencys suddenly blighted and died during July. Early Richmond, Montmorency, English Morello, May Duke, and Windsor are the most largely grown.

Grapes were a fair crop, of excellent quality. All varieties carried their leaves well save the Agawam and Wilder. There was no mildew of any account. Owing to some occult cause the Brightons set but very little fruit. All varieties ripened well, even the Catawba, which is tardy some seasons. Prices were good. Taking one year with another, it is doubtful whether any fruit pays better than the grape. The more profitable varieties grown here are the Worden and Concord for black, the Niagara and Moore's Diamond for white, and for red the Delaware and Lindley. In a general way grapes require more severe pruning than they generally get. I use a mixed system, that is, the spur and renewal combined, which insures fine fruit, and also saves a lot of time in tying. Wherever it is possible I get rid of an old branch and train up a new one to take its place. I also spur the young laterals of the older branches to one or two buds.

Raspberries were a fair crop. The slug did little or no damage. The leading varieties here are: red, Marlboro and Miller for early; Cuthbert and Loudon for late varieties; black, Kansas, Older, and Smith's Giant; white, the Golden Queen.

The Harris raspberry, planted in 1901, does not promise well. It lacks vigor and growthiness.

John G. Mitchell (Georgian Bay Station).

The past season, as regards weather, has been one which leaves little to be desired. Winter was unusually steady and mild, the thermometer only occasionally going below zero, and the coldest about ten degrees below. Spring opened fine and bright, but not too warm—just what is wanted in this section to hold back the buds until all danger of frost is past. Not a twig or bud seemed to burst. But, notwithstanding the fact that everything seemed just right, we have had a very light crop of cherries and apples, caused, doubtless, by the superabundance of moisture of the previous season, which, I think, predisposed the trees to take on wood growth rather than fruit, as they have made a great growth of wood this summer. However, the fruit was very large and fine, and filled many more barrels than we expected.

We practice clean cultivation until about the middle of July or first of August, when orchards are sown to red or crimson clover, which gave us a heavy stand this spring. There are few more beautiful sights than an orchard covered with crimson clover, with all its varying shades. It is a delight for the artistic eye. We plow it in at blossoming time, and also apply all the stable manure and other manure we can spare or readily secure.

From experience and observation I have come to the conclusion that trees must be fed a balanced ration, the same as an animal. Ninety per cent. of the total success depends on cultivation and feed.

A. E. Sherrington (Lake Huron Station).

The season just closing has been a fairly satisfactory one as to quantity and quality of fruit. The winter of 1902-3 was, on the whole, a model one, the lowest temperature being 13 degrees below zero; but even at that temperature the peach buds, and even some of the trees, were killed. This was owing, no doubt to the condition the trees were in at the time. The spring opened up very early, with summer-like weather in the month of March, which brought vegetation on, only to be injured later by frost. On May the 1st there were twelve degrees of frost. Currants and gooseberries were in full bloom. Currants and cherries suffered the worst, black currants being a total failure. Two varieties of pears were sent by the Department, for planting at this station the past spring, the experimenter adding four varieties of plums. All of the stock is doing very well. All small fruits, with the exception of currants, were a splendid crop, especially the raspberries, which were exceedingly fine. Cherries were very light, with the exception of English Morello and Ostheim, and, as usual the birds took the bulk of the crop. Plums were a fair crop, and of good quality. Pears were good, and a number of the trees in the experimental plots commenced to bear this season.

Apples were a very good crop, and of fair quality. The most of this crop in this section was handled by the Lake Huron Fruit Growers' Association, and shipped under the co-operative system, fourteen carloads being shipped in this way. Fungus was not so prevalent as last year, but better spraying must be done if we wish to produce No. 1 fruit ; more power will have to be used, and more attention paid to the spraying of the tops of the trees. Insects were not numerous this season, with the exception of the black and green aphis, which attacked the cherry, plum, and apple trees in large numbers. To control those pests, our plums and cherries were sprayed twice with whale oil soap.

Chas. Young (Algoma Station).

The past season has been a peculiar one here in Algoma in many respects—cold and wet, so much so since early summer that the use of the cultivator was impossible for weeks at a time ; nevertheless we have had a very good crop of fruit, especially of fall and early winter varieties, and the trees have ripened up their new wood well. I have noticed among those who do not spray more scab than formerly, which perhaps, may be accounted for by the moist weather during the growing season. The only insect pest which has caused any trouble was the aphis on the apple, and it was a struggle between them and the grower which would win. When taken in time, I did not find much difficulty, but with those who only have a few trees they were apt to be overlooked, when the job of getting clear of them was much more difficult.

At the fall show of the Western Agricultural Society, held in the Town of Sault Ste. Marie, the more prominent fruit growers in Algoma seem by instinct to have met for several years past to compare notes and exhibit new varieties. Something like 30 different varieties were shown in collections by each exhibitor. I am aware that this is not quite in accordance with the required rule as laid down for exhibitors, but so far it has served our purpose well and given many of us an opportunity of seeing samples of which we only had heard the names of before. Of fall apples, we had plenty to choose from. The same may be said of early winter varieties. What we wanted, and what we have long been trying to get, is an apple of first-class quality that would keep into spring. Spys, Kings, and Baldwins we cannot for some reason or other grow, and although all these have been top grafted on hardy stock, I have never heard of an apple being produced. Last year, however, indeed, for several years, I have had some very good Wageners, and last year some excellent specimens of Ontario have been shown. Should these varieties succeed further back from the influence of the lake, we have probably got just what we have been looking for. Why these have produced such fine fruit when Spys have been so unsuccessful I cannot say, for I have always considered Ontario and Spy as belonging to the same family. Mann also, an apple which I have always considered not quite hardy, was on exhibition. Indeed, from present experience, it may just be possible that the fruit belt, like the wheat belt, is moving westward.

I am very much pleased to notice that there is a probability of a fruit station for the Temiskaming district. This is just as it ought to be, for there is a vast field for experimental work north and west of the Georgian Bay, and if there had been any reliable information for this District of Algoma twenty years ago, it would have saved the settlers many thousands of dollars, and we would not have such statements made as "I planted an orchard of Greenings eighteen years ago and never got an apple." Last summer I made inquiry of a man who had planted quite extensively two years before and reported failure. I asked him what kinds he had planted. He said, all Baldwins The agent recommended them as being the biggest-priced apples in England, and backed up his recommendation with a clipping from some horticultural journal that it was a mistake to plant many varieties.

I do not know that we have many members of the Fruit Growers' Association in Temiskaming, but a few ideas gathered from experience and observation may not be out of place to the new settlers. First, do not wait for any experiment station; begin right now. Avoid low, flat, heavy clay if possible, but if suitable soil near the house cannot be had, ridge up the land 30 feet wide and plant 25 feet apart on the ridge. Do not plant deep; there is no danger of root-freezing in Temiskaming, as the snow falls early and deep. Second, shelter is desirable, but not absolutely necessary; a free circulation of air is better than a closely confined orchard. Third, give clean cultivation for three or four years by growing roots. There is no need for any cover crop; the snow is better than anything you can grow; in fact, I have seen it a harbor for field mice in winter. Fourth, give protection to the trunks of the young trees by wrapping with a piece of building paper, a barrel stave, or a strip of bark on the south side to prevent sunscald in the spring. Fifth, have three limbs branching out about four feet from the ground. Any lower than this the tops are liable to broken by the weight of soft snow in the spring, while high trunks are more likely to suffer from sunscald. Plant Duchess, Longfield, and Wealthy; these will give you fruit from 1st September to 1st March in the north. For anything further, wait for results from your nearest station. If success is assured, make a personal visit to your station; it is far more satisfactory than any amount of writing to those who contemplate planting. All small fruit will grow there, many of them better than in the old townships of Ontario, except blackberries and grapes. Do not bother with them; they will not succeed. Do not cover your strawberries before winter sets in, or possibly you may find them partly smothered in the spring. This is not in accordance with the advice of horticultural journals, but our conditions are different. Finally, plant a few trees, make a resolution to give each of them at least as much attention as you would a hill of potatoes.

Harold Jones (St. Lawrence Station).

The season just past has been one of the most favorable for the production of a perfect crop of apples that we have had in years.

From early April to June 16th we had not a drop of rain, and during that time it was cool, but no frosts in May. The trees blossomed in weather of perfect sunshine, and fertilization of the blossoms was perfect. All trees that blossomed set a full crop, and all so perfect and healthy that there was very little June dropping. On June 16th we had a heavy rain set in that lasted two days and a night, and about 4 inches of water fell, that was taken up by the soil as though it was a sponge; and following this rain we had more or less continual showers all summer until the middle of November.

Orchards were singularly free of all insect pests, and fungi hardly made an appearance.

Fameuse and kindred varieties that usually spot badly, where not sprayed, came through perfectly clean, even where not sprayed at all. This season's observations on the development of "spots" helps to impress upon all earnest thinkers the necessity of early and frequent sprayings in years of normal rainfall. Through April, May, and the first half of June, there was no moisture to develop fungi, but from June 16th to late fall, conditions were very favorable for its growth. Still, the fruit remained clean. For some years I have found that trees that I sprayed every week or ten days from the 1st of May to the middle of June, and then stopped, were cleaner than those only sprayed two or three times before that date, but continued into August. Further work and thought along this line will likely demonstrate to a certainty that if the spot is kept under absolute control for the first month and a half of the growing season the crop is practically safe.

The experimental orchard was under clean cultivation, with a cover crop of clover plowed down in the plum and pear blocks; in the apples a cover crop was plowed down, barnyard manure applied, and planted to corn.

All the apple trees have done well, and made good growth, except Blenheim Orange. This tree was injured by the winter, all the limbs dying, but they sent out a new growth of suckers, which are going into winter in a green, sappy state, and will probably be dead in the spring.

The European and Japanese plums are showing further weakness and unsuitability for this section, which shows that we must look to the American type for thrifty and hardy trees that will blossom and bear fruit.

In pears many of the standards for Western Ontario are proving tender here, but Flemish Beauty, Clapp, Ribston, and Keiffer are varieties that will succeed and give us fruit of good quality.

W. W. Hilborn (Southwestern Station).

The season has been on the whole a favorable one for the fruit grower. Peaches were rather above an average crop, and on account of plenty of rain the fruit was larger than usual. Fruit rot was quite prevalent at several periods during the ripening season on account of an excess of rain.

This disease caused more injury than it has done previously for many years. Orchards that were not sprayed lost a large part of their foliage; quite a number of trees died from this cause. Spraying to be effectual must be done early in spring. The earlier the better, and certainly must be done before the buds start, otherwise but poor or indifferent results will be obtained. Lime, salt and sulphur, or Bordeaux mixture will control this disease if properly done at the right time.

Plums were the most abundant crop ever known in this locality. Reasonable prices were obtained for the first early varieties; of these the Japans took the lead; Red June, Satsuma, Abundance, and Burbank were most profitable of the older or well tested kinds.

Cherries are coming into more prominence as a market fruit, and the supply at present does not equal the demand. The great drawback in cherry culture is the difficulty in getting the fruit picked on account of the scarcity of suitable help, and also on account of fruit rot, which often destroys a large portion of most of the sweet varieties. Among the most profitable sorts in my orchard are the following: Windsor, Smith's Biggarreau, Yellow Spanish, Napoleon, and Gov. Wood, of the sweet cherries; Early Richmond, and Montmorency, of the sour or Morello type.

While pruning last spring, I discovered San Jose scale in two of the experimental blocks. The first was on Japan plum trees, the second on a peach tree. The scale was very numerous on two trees in each locality. In the plum block quite a large number of trees contained more or less scale. The trees in both cases were six or seven years planted. When I discovered the scale, my first impulse was to take out and burn all infested trees and those in their immediate vicinity. This would, however, have destroyed quite a number of valuable trees, some of which could not be replaced. As it was early in the season, and no danger of the scale spreading for some weeks, I concluded that before pulling the trees out, I would wait a few days for more mature judgment. In the meantime I wrote Prof. Lochhead at the O.A.C., Guelph, who advised me to spray with lime and sulphur mixture. The usual method of boiling this mixture for four hours in a kettle deterred me from making it that way for want of time for the operation. I succeeded, however, in getting a small steam boiler (a kind made in Leamington for steaming hog feed), which answered the purpose admirably. This, with two coal oil barrels, one for heating water in, the other for boiling the mixture, makes a very satisfactory outfit with which to manufacture the lime, salt and sulphur preparation. The formula I use is 15 pounds lime, 15 pounds sulphur, and 10 pounds salt. In making I proceed about as follows: Fill one barrel with water, turn in the steam until hot; then turn the steam into barrel No. 2, in which four or five pails of water have been placed. When this has been heated nearly to the boiling point put in 15 pounds good, fresh, lump stone lime, stir constantly while slaking to prevent lime from burning. As soon as the slaking has advanced sufficiently to admit, add 15 pounds sulphur by rubbing through a sieve made of door screen wire netting. Stir constantly while adding the sulphur. It is well at this time to add four or five more pails of hot water from barrel No. 1. Boil one hour, then add 10 pounds salt, and boil 15 minutes longer, when it is ready to put into the spraying barrel. It must be put through a strainer. I use a short linen sack, stretched over a form made of wood or wire to hold the mouth of the bag open. As soon as the mixture is cooked turn the steam into barrel No. 1, and heat the water as nearly to the boiling point as possible while the mixture is being strained. They add sufficient water (as hot as possible) to fill the spray barrel, and proceed to use it at once. If left to get cold it is not effectual. With my two boys I made and applied 16 barrels in three days. The result has been that at this writing (November 10th), after diligent search, I have not been able to find one living scale in my orchard.

I have heard and seen so much about the destructive powers of the San Jose scale that when I first discovered it in my orchard I must confess that I was afraid it was the beginning of the end of fruit growing for profit with me. I can now state, however, that the scale does not give one an anxious thought. I am not sure but there is some truth in the statement made by a noted American fruit grower, "that the San Jose scale was like weeds—a blessing in disguise." The trees that were thoroughly sprayed with this mixture have been more healthy and less injured by insect enemies and fungous diseases. I am convinced from this one season's trial that it will pay well to give an annual spraying with this mixture, even where there is no scale, for the general cleaning up it gives the trees.

A. E. Annis (Wabigoon Station).

—	Vigor.	Hardiness.	Productiveness.	—	Vigor.	Hardiness.	Productiveness.
GOOSEBERRIES.				RASPBERRIES.			
Downing	4	4	1	Older	2	2	2
Pearl	2	2	2	Columbian	8	6	8
Red Jacket	4	4	4	Cuthbert	8	7	7
				Miller	8	6	6
CURRANTS.				Louden	8	6	4
				Marlboro	8	7	7
Cherry	8	8	9				
Fay's	6	8	6	STRAWBERRIES.			
Saunders	9	10	9				
Lee's	9	10	9	Clyde	8	5	7
White Grape	9	8	10	Williams	8	6	8

This climate, I think, is too severe for apples (standard). I have a number of trees now about 4 1-2 feet high, grown from seed, which are alive to the top bud year after year. I have three crabs, but they have not fruited yet ; some of their branches kill back in the winter.

One Ostheim cherry is making very slow growth ; it kills back almost to the main trunk every winter.

NOTES ON APPLES.

G. C. Caston (Simcoe Station)

There was added only one variety to the list this year, "Wismer's Dessert," said to be an excellent dessert apple. Of the new varieties fruiting there were one or two Russians, early varieties, of such a short season and poor quality as to be not worth any description. In speaking of the Russian apples, I might make one exception among the varieties. It is one that was sent here from the Experimental Farm, Ottawa, before I began experimental work at all. It was sent under the name of Lode, though Prof. Macoun thinks it is not the proper name for it. It is an excellent dessert apple, of about the same season as the Duchess of Oldenburg, and the tree is very hardy, healthy and vigorous. In fact, those Russians, so far as my experience of them goes, are only to be recommended for northern sections, where only the most hardy varieties will succeed. Their hardiness is their principal merit, and I certainly would not recommend any of them for this locality, where we can grow so many better varieties. Their principal use here would be as stock for top grafting upon, and even for that purpose I would much prefer the Talman Sweet.

Of the other new varieties fruited two are worthy of special mention, which I think will, on further acquaintance, prove worthy of recommendation :

Dominie. A large green apple, over three inches in diameter, with a brownish red tinge on one side. In shape like the Blenheim Pippin, with a short, thick stem, set in a wide, moderately deep cavity, and a large, open calyx in a wide, deep basin. As only one specimen was grown, it has not been tested as to quality of flesh, or flavor, but is evidently a long keeper. It is clean, and apparently not likely to be affected by scab.

North-West Greening. This is a green apple of large size, conical in shape, medium stem, set in a narrow, deep cavity ; calyx closed in a very small, shallow basin ; skin green, turning to a yellowish tinge at maturity, showing on one side very minute brown dots. It is evidently a good keeper, being at this time hard in texture, Flesh yellow, crisp, juicy, with a pleasant, aromatic flavor.

North Star. A large, green fall apple, coarse flesh, but of fairly good flavor. In the presence of so many better ones of the same season, I would not recommend it. We have too many of its class now for the good of the trade.

Hamilton. A handsome, clean-skinned apple, of rich yellow color when ripe, but a short keeper ; inclined to water core ; not recommended for general planting.

Montreal Peach. A large, yellow fall apple, with nothing particular to recommend it.

Windsor Chief. A fine-looking, hard winter apple, evidently a long keeper ; above medium size, dark red in color, and in shape somewhat resembling the Baldwin ; a promising variety, but as the tree only bore one specimen, it will be necessary to wait until it bears a crop before recommending it.

Cooper's Market. This variety is famous as a long keeping variety. The trees here are just beginning to bear, and it certainly is a hard, firm apple. Very conical in shape ; stem medium, set in a deep, narrow cavity ; calyx closed in a very small, shallow basin ; skin green, overspread with dark red, somewhat streaked ; flesh firm, juicy, rather acid ; flavor will no doubt improve toward spring ; season from October to May.

Salome. A bright red, handsome apple, of medium size ; conical shape. A late, long keeper, of fair quality. Tree healthy and hardy.

Winter Maiden's Blush. This variety has fruited two years, and, as it seems to show good qualities, it may be safe to recommend it. It will be a good shipper and keeper here. The apple is large, much larger than the fall variety of that name, and of a different shape, being quite conical and somewhat ribbed, with a very short, thick stem, set in a wide shallow cavity ; calyx open and small, in a very small, shallow, plaited basin ; skin green, turning to yellow at maturity, showing minute green dots, and overspread on one side with pale red, lacking the bright, handsome coloring of the fall variety ; flesh white, crisp, juicy, acid; a good cooker ; season probably from October to February.

Peter. This variety, sent out some years ago under this name, is, in my opinion, simply the Wealthy under another name. We have far too many of that sort in this country now, and it would be a difficult task for a nursery agent to sell Wealthy trees to any experienced grower here.

McIntosh Red. This variety has excelled itself this year, being free from scab, and nearly twice as large as usual. If it can be kept free from scab by persistent spraying it will no doubt prove a profitable variety to grow as a dessert apple, and will take the place of the Snow, which is not entirely satisfactory here. The Snow, when large and clean, is a very salable apple, but so few people spray their orchards that it is only in years like the present that it is marketable condition. The trees are also inclined to overbear, and then the fruit is too small. One way of overcoming this difficulty is by severe pruning, and if ever a variety calls for a thorough pruning and spraying that variety is the Snow.

Ontario. This apple has been in bearing for three years, both top grafted and on the nursery tree, and I have no hesitation in recommending it as a valuable addition to the commercial list for the district. Though in point of quality it does not come up to the Spy, yet its fine size, clean skin, productiveness, and early bearing commend it as a valuable variety.

Baxter. There is nothing new about this variety, except that this year it has suddenly become famous by making a record price for itself in the British market, the highest probably ever recorded for a Canadian apple. It is not a big yielder, but bears pretty regular crops, and, like the Snow, is very susceptible to the attack of scab It requires strong, rich soil, and does best on high table land or land that is rolling, and should be thoroughly sprayed. It has the peculiar habit of bearing its fruit on the ends of the small twigs, and is more liable to damage from high winds on that account when fruit is near maturity. The flesh is coarse, but withal has a rather pleasant flavor when ripe, and is a splendid cooker. But its large size, and bright, handsome color is what makes it a good seller, when free from scab, as it is this year.

Gano. This variety still maintains its good reputation here as a profitable apple. Two trees, planted in 1895, bore two barrels each of first-class apples this year. I consider it in all respects superior to the Ben Davis.

Shackleford. A green winter apple, has born a few specimens for the last two or three years, but unless it shows evidence of bearing better qualities as it grows older it will scarcely find a place in the recommended list.

The Secretary.

Hubbardston. On the model prize list which has been issued by the Association of Fairs, in their first annual report, we note the name of Hubbardston, a variety of apple which is less known and less cultivated in Ontario than its merits deserve. It is really one of our best early winter apples, being higher colored than King and more productive that Ribston.

In those sections where it has been found to succeed, this apple should rank high for planting in the commercial orchard, but we hear so little about it at our meetings, and so seldom see it at our fairs, that we conclude it has not been tried in many parts of our Province. Some years ago we received some samples from a subscriber at Beamsville, which were very fine and beautifully colored, and the grower said he counted them among his most valuable market apples. Mr. A. A. Wright, M.P., of Renfrew, speaks most highly of the apple for a retail trade, and says that it is the favorite variety called for by his customers.

The Hubbardston originated in Hubbardston, Mass., whence, of course, it takes its name The following notes on this apple from various fruit growers will be of interest :

E. Morris, Fonthill : The Hubbardstone apple is not grown extensively in this section, just a few odd trees. The apple as grown here is a very productive one, and of good quality, but ripens a little too early for profitable shipping.

A. E. Sherrington, Walkerton : The Hubbardston does well here with Mr. Shaw. The tree is a vigorous grower and an annual bearer, and the fruit does not spot. I think it would be profitable.

A. M. Smith, St. Catharines: Hubbardston Nonsuch is not much grown in this section, but among our packers it is highly esteemed. Titterington & Co. say it is one of the best of the late fall for market. I have never fruited it myself. Some have confounded it with the Blenheim Pippin, which it somewhat resembles, but is smaller in size and a little better keeper, being classed by Downing as an early winter.

Ben Davis. Mr. Dempsey says: It always pays me well, but it has its own season in the market, and that is toward spring, after the Baldwin and Spy have been well cleared out. Nobody wants to eat a Ben Davis in fall or early winter; it is not ready so early. My own family use more Ben Davis than Baldwin, because in Baldwin season they prefer to use Spy; but when these are over, say in April, then they call for Ben Davis, and by that time it is good for all purposes.

'I have great confidence in Ben Davis for top grafting upon," says Mr. Shourds of Wellington, Prince Edward County. "A Spy tree is apt to split at the crotch, but Ben Davis is tough and does not break down; besides Spy, top grafted on Ben Davis, bears fairly early. I have an instance where I top grafted Spy on the branches of a Ben Davis at three years after planting, and at seven years it began fruiting. I am planting twenty acres to Ben Davis trees, and if I want Spy I will have first-class stock upon which to top graft it."

Phoenix. This is grown to a considerable extent in Northumberland County, and some growers value it highly. Mr. Solomon, of Brighton, a packer at Butler's storage, said he found it quite as productive as Baldwin, as good a shipper and seller; but Mr. C. W. Crandall, of Colborne, thought it inferior to Baldwin, and all owned it was not as good a keeper, and should be shipped before January or it would discolor. The samples given us on January 20th, however, were still bright in color and in excellent condition.

Stark. In response to our inquiries regarding the behavior of the Stark apple in Ontario, we have received the following:

W. H. Dempsey, Trenton, Ont.: The tree has made very rapid growth; the foliage is large, dark green in color, and somewhat subject to fungus; very productive every alternate year; the fruit is large, clean, dull in color, and not so attractive in appearance as many other varieties, and it is a first-class commercial apple only for this fault. In some localities it has been shipped under the name of Baldwin.

Sam Nesbitt, Brighton, Ont.: In respect to the Stark apple I have always found it to be an exceedingly good shipper for export, as it apparently stood the passage over better than most any other apple in the months of February and March. There was one other point in it's favor, and that is that it never discolored. Whether this will hold good after it has been as long a time as the Baldwins is a question that only the future will decide. The tree is a most prolific bearer, and the only objection that I have to the apples (and the same thing applies to buyers in the United Kingdom) is the fact that they are not the right shade of red, making it difficult for the people who sell fancy apples to polish them and make the display that is necessary to catch the eye of the consumer.

Harold Jones, Maitland: In this section, where Spys and Baldwins cannot be successfully grown, the Stark has come to stay. It is perfectly hardy and a heavy bearer. The fruit keeps well into April. The color is a little dull, but the size and other good qualities mentioned places it near the top of the list as a desirable winter apple for the St. Lawrence valley.

When attending the Fruit Institute meetings last winter I included Stark in a short list of best winters for planting in the commercial orchard.

Red Astrachan. This was introduced into England from Sweden in 1816, and since the Early Harvest has become so badly affected with scab, the Astrachan has been largely planted in Ontario as an early summer apple. The tree grows to be a large size, and is very productive; one at Maplehurst, forty years planted, gave a yield of ten barrels in 1895, which is not unusual, so that when prices are good this apple is very remunerative. The quality is only fair, and very tart; but the large size of the fruit, and its deep crimson color, often covered with a thin whitish bloom, makes it very salable.

During the last four years New York State and Ontario have been producing this apple in such quantity that after the first two or three pickings the price has been very low, and we have been compelled to seek for a distant market. The apple is so tender that it is impossible to land it in the British markets in good condition except by cold storage, held at a temperature of about 33 degrees F., a condition which it has hitherto been difficult to ensure.

King. The King is one of the favorite varieties in the market, but unfortunately it is so shy a bearer on its own roots that it is not very profitable. It has, however, frequently been noted that by top-grafting it on any vigorous stock it becomes much more prolific.

The Fruit Division, Ottawa, invited correspondence upon this subject, and has received some valuable information. Mr. C. L. Stephens, of Orillia, has the King top-grafted on Duchess, and finds that its bearing qualities are quite satisfactory. Mr Wm. Read of Jarrat's Corners, has twelve King trees grafted on Duchess, and reports equally good results. Mr. Judson Harris, of Ingersoll, has an orchard of two and a half acres, the crop from which the past eight years has never brought him less than $500. Many of these trees are Kings grafted on Russets. Mr. Robert Murray of Avening, has a number of King trees on their own roots and others grafted on Talman Sweets, and notes that the top-grafted trees are the only ones that give him paying crops.

The experience of these growers and many others goes to show that it would be a very profitable business to top-graft at least some of the early apples to be found all over Ontario with Kings. The King is an apple that exactly fills the bill as a fancy market variety, as it is of excellent quality, color and size, and well known in the English market. If its only defect, want of productiveness, can be cured by the simple method of top-grafting, it should prove a boon to many people who have vigorous trees of undesirable varieties.

John G. Mitchell (Georgian Bay Station).

In apples the well-tried old varieties still hold the lead. For export we find Baldwin, Greening, Ben Davis, Spy, and King the most profitable. The latter variety seems to require top-grafting on to some hardy stock, such as Talman or Russet. I know a great many King trees good bearers grafted on these stocks. The only new variety which seems worthy of planting largely here is Ontario. The more experience I have with it, the more I am impressed with it and the better I like it. It is large and showy, a good keeper; not as good quality as Spy, but a good apple if kept till maturity ; a fairly good grower, and an early and abundant bearer. Several young trees six years old in a neighbor's orchard produced a barrel each of fine clean fruit this fall.

R. L. Huggard (East Central Station).

We have no trees injured by last winter ; all came out in leaf, and later in full bloom, except Baldwin, King, and Pewaukee, most of which had no bloom. Greening, Canada Red, Ben Davis, Mann, Baxter, and several others had light bloom ; while Spy, Minkler, Salome, Boston Star, Stark, all the Russians, Astrachan, Duchess and many others, were well loaded with blossoms and fruit. Of the newest varieties, Stark yielded the largest quantity, nearly 4 bushels per tree. Gideon, Northern Beauty coming next, with over 3 bushels per tree ; Duchess and Transparent, about 2½ bushels per tree. Wolf River and Alexander were about equal, 1½ bushels per tree each ; McIntosh Red is not a success, as the fruit is so deformed, not over 30 per cent. being uniform and perfect. Winter Maiden Blush was fine, large, and handsome; Russets are very fine, clean, and large. Pippins were large and clean, but a light crop ; and Salome was well laden with beautiful fruit.

Varieties that promised to be productive, judging by yield in 1903:
Yellow Transparent, Duchess, Fameuse, Wealthy (or Gideon, or Western Beauty).
For export: Stark, Salome, Shackleford, Wolf River, Bismark.

Charles Young (Algoma Station).

In making my report for 1903, I may begin by stating that there are now some 60 or 65 varieties of apples under test here, all of which are healthy and making satisfactory growth. With a few exceptions, all of those planted in 1899, have fruited this year. Sweet Bough is the only one not able to withstand the climate. A special selection of hardy varieties only were at first started with me; later some new, untested varieties have been added. I have top-grafted on old stock almost everything I have seen recommended. Two of the later planted, viz., Pewaukee and Ontario, planted three years ago, did not leaf until the middle of July, and have this year made a fine growth. I have also serveral varieties of Russian apples, now generally propagated, large, handsome fruit, but all fall apples, and with nothing much to recommend them. Two of the best are Basil the Great, and Orel. Among those that so far have not been satisfactory here I may mention Ben Davis. The color, which goes a long way in selling it in other localities, is wanting when grown here; I might call it a dirty brown, and it looks unmatured. Scott's Winter, often recommended for the north, unless under very high cultivation is too small; it takes too many to fill a barrel, although the keeping qualities are all right; it will not be a profitable apple to grow. For a sweet apple Talman is all right, the trunk is freer from sunscald than any other, not excepting the Duchess, which so far has been the money-maker. We cannot begin to supply the local demand at 25 cents a 10-quart basket.

A. E. Sherrington (Lake Huron Station).

Barry: A small, worthless apple, will top-graft in the spring.

Bismarck: A medium to large apple; color, skin yellow; nearly covered with a rich red; quality fair, subject to scab.

Gano. Nothing but a Ben Davis with me.

Peter: Resembles the Wealthy very much; early and annual bearer; about the size and quality of the Wealthy.

Salome: Tree a fine grower, but fruit small to medium; rather uneven in size; needs further trial.

Wine Sap: A very nice apple, but too small to be profitable.

Harold Jones, (St. Lawrence Station).

Chenango Strawberry: A healthy and hardy tree; moderately vigorous; bears in from three to four years from planting. Fruit medium-sized, oblong, conical; an attractive-looking apple, and good quality for dessert; season September, but will keep in fair condition in cold storage until December.

Gideon: A healthy, vigorous, hardy tree, comes into bearing two or three years after planting. Fruit 2 1-2 to 2 3-4, conical; skin waxy white, blushed with pink; a handsome apple, of good quality for cooking in its season; season September and first half of October, after which date it shows decay at the core, and is utterly worthless long before it shows any defects at the surface; growing in disfavor among buyers, and not desirable to plant in large numbers.

Longfield: A very hardy, vigorous tree, of drooping habit; commences to bear fruit in two years after planting, and trees of five years of age will produce heavy crops. Fruit medium to small; shows finger marks and bruises, and is hard to handle for packing; season September, October. This would be very desirable for planting one or two trees in a garden for home use, but is useless as a commercial apple. This tree has been largely advertised by nurserymen, and sales pushed by travelling agents. So there is, no doubt, a large number of these trees just coming into bearing, which will be a disappointment to the owners, as they were sold in many cases as winter apples. However, they have got a capital stock for top working, and can easily change the head to some desirable and profitable variety.

Ontario: I have looked upon this as a very promising apple, one that would take the place of the Spy, but the tree is proving not healthy, subject to canker in the trunk, and will be short lived; it bears in three or four years after planting; it resembles the Spy in appearance, but is not so good in quality.

Salome: A hardy, healthy tree, with a close, round head; vigorous grower. The trees I have planted are on clay loam, and the fruit is absolutely worthless, not much larger than good crabs, and does not reach maturity; third year of fruiting. Good reports are received on this apple from the counties in the vicinity of Toronto, but I have never seen a good specimen in the St. Lawrence counties yet.

Blenheim Orange. Proving tender in this section, and cannot be recommended for planting.

Peter: In every way seems identical with Wealthy; an early and heavy bearer, of medium to large, handsome fruit; desirable for planting, as it is a good commercial apple, and ships well to the European market.

Pewaukee: A hardy and vigorous tree; an early and heavy bearer; fruit of fair to good quality, both for cooking and dessert; does not show up well in the package on account of its peculiar formation and dull colorings, but is a good February apple, and commands fair prices. Its chief fault is dropping before maturity, which is a very serious one in a winter apple.

Sutton Beauty: A slow, weak grower with me, and is not proving hardy.

Milwaukee: A strong, vigorous grower, very hardy; very much the character of the Duchess in growth; needs very little trimming, and is a business tree, commencing to bear in two or three years after planting, and gives good crops of fruit of large size, 3 to 3 1-2 inches across the core; rather coarse in flesh, but brisk acid, and a good cooker; a good February apple. I have kept it in good condition till April. This tree would pay well planted close, say, 15 x 25 feet, and thinned out as they get age, leaving them 25 x 30 feet, as they come into bearing early, and make fruit rather than wood as they get age; a valuable addition to our small list of good winter apples.

North-West Greening: A vigorous, hardy tree, forming a close, round head, requiring rather severe pruning; an early bearer and a heavy cropper; fruit of large size; greenish yellow, sometimes with a dash of pink on the sunny side; quality not equal to Rhode Island Greening, but more attractive in appearance; season winter; desirable.

Switzer: A hardy, vigorous, spreading tree; fruit of medium size; skin white, almost covered with bright red; flesh tender, juicy, melting; ripe in August and first week in September; drops as soon as ripe; not valuable for general planting.

Shackleford: A hardy, spreading, moderately vigorous tree; an early bearer and heavy cropper; fruit of good quality, but unattractive in appearance; skin greasy, which gives the fruit a soiled appearance when handled.

Canada Baldwin: A very hardy, vigorous tree; comes into bearing slowly, six or seven years after planting; gives promise of being a valuable apple.

A. W. Peart (Burlington Station).

Of the 39 varieties of Southern State apples top grafted on Roxbury Russet trees in 1901, 7 have borne fruit this year:

Hanseley's Winesap: 15 apples, mottled red; small to medium, conic, round; stem medium length; very few spots; basin shallow, moderate.

Highfield: 1 apple, medium, roundish flat, red spotted.

Ozark: 3 apples, medium dark, handsome, roundish flat, badly spotted.

Rebel: 4 apples, large red, handsome, roundish flat, no spots; the most promising so far of the lot.

Red Belleflower: 1 apple, small, oblong, conical, dark red, spotted.

Wandering Spy: 2 apples, medium to large, roundish flat, red, some spots.

All of the above appear to be late varieties, as they are now (November 10th) quite firm.

The seven varieties of Southern apple trees, as well as the dwarfs, Alexander and McIntosh, and the standard Bismarck, have grown well.

Stanley Spillet, Nantyr, Ont.

My Princess Louise, obtained from the Association, gave two barrels of magnificent fruit. Scores of people have sampled it, and all declare it to be away ahead of Snow in size, color, flavor, and freedom from scab. Grafts from the tree are in demand here.

W. H. Dempsey (Bay of Quinte).

Downing's Winter Maiden's Blush (Syn. of Greenville): Planted in 1896; seems to be very backward about fruiting, only a few apples on the trees, while the ones top grafted were well loaded with fine, large, handsome apples; fruit hung well to the trees until November 1st; quite free from apple scab, although on the same tree with Winter Fameuse, which always has more or less scab on it.

Western Beauty: Planted 1896, and Peter, planted 1897 (which are both identical with Wealthy), bore 3 bushels to the tree of fine, large, highly-colored apples, of which 90 per cent. were No. 1.

Wallbridge: Planted in 1896; fruited this year for the first time, four bushels; 40 per cent. No. 1; very uneven in size; tree good grower.

Longfield: Planted in 1895; has been fruiting more or less since '98; sets more apples that it can carry to a marketable size; therefore of no value unless very carefully thinned; ripens in September; fruit very tender, showing the least mark in handling.

Beauty of Bath: Planted in 1896; not very productive, 1 peck to the tree; fruit handsome in appearance, but flesh very dry and mealy; season, August; not worth growing in this district.

Sutton Beauty: Planted in 1896; has been slow in coming into bearing, only a few samples each year.

Barry: Planted 1896; bore a few apples of no value for anything.

Starr: Planted 1896, from Wm. Perry; 3 trees, which bore a few small, worthless apples, not of the same form as produced by scions received from the same source at the same time, which are of large size, very similar to Primate, and of the same season; valuable to the amateur grower as an early apple.

Milding: Planted in 1897, making a good growth; bore a few fine specimens this year.

Newtown Pippin: Planted 1897: trees have made medium growth; bore two apples this year.

Dudley's Winter: Planted in 1896; fruiting three years; September and October apple, of no particular value.

Gano: Planted in 1898, commenced fruiting the second year after planting; bore one-half bushel this year of handsome red apples, very similar to Ben Davis in every respect, only a little darker in color.

Shackleford: Planted 1896; bore three pecks of fair-sized apples; very similar in coloring to Spy.

Many of the varieties which were top grafted on bearing trees, bore heavily this year, of which the Windsor Chief (which bore very heavily for the amount of top), Downing's Maiden Blush, Boiken, Winter Banana and Roman Beauty are among the most promising of the winter varieties. The worst pests we had to contend with this year were green aphis and pear-tree psylla.

NOTES ON BLACKBERRIES.

A. W. Peart (Burlington Station).

Blackberries were an expectionally heavy crop. Owing to the continued warm, dry weather during May they began to blossom about a week earlier than usual. The cool weather, however, of June and July delayed their ripening beyond the normal period. Occasional showers during August prolonged their season, and prevented many of some varities from drying on the bushes. In the new plantation, set out in 1901, all varities thus far, appear hardy. This plot will serve not only as a double test, but also as a check on the old plantation, and will, we hope, help us to dig up wider and deeper facts in relation to the different varieties. The weather conditions have been favorable to a very good growth, yet the dry fall promises well-ripened canes. They have been very free from insect and fungous diseases.

The following varieties are considered too unproductive for this section: Maxwell, Childs' Tree, Dorchester, El Dorado, Wachusetts, Wilson's Junior, Ancient Briton, Early Cluster, and Minnewaski. Lovett's Best, Gainor, Early King, Humbolt, and Wilson's Early deserve further trial.

These appear to be the most desirable for a commercial plantation: Agawam, Kittatinny, Erie, Ohmer, Snyder, Taylor, and Western Triumph. Should the Early Harvest prove hardy, it would be a desirable acquisition, on account of its earliness. Varieties which bear heavy loads should be pruned severely.

Agawam: Cane dark red, vigorous, upright grower, hardy, and productive; berry roundish oblong, medium size 7-8 x 3-4 inches, sweet, but rather insipid; season medium, July 25-August 20; a good commercial variety; resists drouth very well.

Ancient Briton: Cane dull red, moderately vigorous, upright, not productive; berry oblong, conical, medium, 7-8 x 3-4 inch, of good flavor; season medium, July 25-August 20.

Dorchester: Cane brownish red, vigorous, upright, spreading, hardy, but a poor cropper; berry large to very large, 1 1-8 x 3-4 inch, roundish, oblong, firm, of fine quality; season medium, July 25-August 20.

Early Cluster: Cane dull red, vigorous, upright, spreading, not productive; berry roundish, oblong, medium, 7-8 x 3-4 inch, sweet, of good quality; season early to medium, July 20-August 20.

Early Harvest: Cane greenish, medium, vigorous, stiff and upright, retains foliage late in season, very productive, and requires close pruning; berry medium to large, 1 x 3-4 inch, oblong, conical, of fair quality; season early, July 15-August 5; hardy thus far in new plantation.

Early King: Cane dull red, moderately vigorous, upright, spreading, productive; berry small to medium; 3-4 x 5-8 inch, roundish, oblong, of excellent quality; season early to medium, July 18-August 10.

El Dorado: Cane brownish red, upright, spreading, medium vigor, hardy, not very productive; berry medium to large, 1 x 3-4 inch, oblong, conical, sprightly, of excellent quality; season medium, July 25-August 20.

Erie: Cane greenish red, moderate vigor, spreading, retains leaves late, hardy and productive: berry of good quality; medium, 7-8 x 3-4, roundish, conical; season medium, July 25-August 20.

Gainor: Cane reddish green, very strong, spreading grower, retains foliage late, hardy and productive; berry very large, 1 1-4 x 7-8, roundish, oblong, of fine quality; season medium, July 25-August 20; promising.

Humboldt: Cane reddish green, upright, hardy, of moderate vigor; a new bush, not sufficiently established to report upon fruit.

Kittatinny: Cane dark red, with greenish patches, very vigorous, upright, spreading, late foliage, hardy, moderately productive, will stand long pruning, very resistive of drouth ; berry large to very large, 1 1-8 x 3-4 inch, oblong-ovate, sub-acid, rich and juicy ; season late, July 30-August 30 ; one of the best.

Lovett's Best : Cane dark red, a strong, very stiff, upright grower, hardy and productive ; berry oblong-round, medium, 7-8 x 3-4 inch, of fair quality ; season late, July 30-August 30.

Maxwell: Cane reddish green, retains leaves late ; very weak, light grower, very spreading, hardy, poor cropper ; berry oblong-round, large to very large, 1 1-8 x 3-4 inch, of excellent quality ; season medium, July 25-August 20.

Minnewaski : Cane reddish green, retains leaves late, strong, upright, spreading, not productive ; berry medium, 7-8 x 3-4 inch, roundish-oblong, of good quality ; season early to medium, July 20-August 15.

Ohmer : Cane reddish green, vigorous, spreading, retains leaves late, hardy and productive ; berry very large, 1 1-4 x 7-8 inch, coreless, oblong-oval, of good quality ; season medium, July 25-August 20.

Snyder : Cane dark red, strong, upright, hardy and very productive ; berry medium, 7-8 x 3-4 inch, oblong-oval, of fair quality ; season early to medium, July 20-August 15 ; requires a rich soil, with damp sub-soil, very close pruning ; a good market variety.

Stone's Hardy: Cane brownish red, strong, upright, hardy and productive; berry oblong-oval, somewhat soft, small to medium, 3-4 x 5-8 inch, of good quality ; season medium, July 25-August 20 ; rather small for profit.

Taylor : Cane reddish green, medium vigor, upright, spreading, hardy and productive ; berry medium, 7-8 x 3-4 inch, oblong-oval, rich, of good quality ; season medium to late, July 25-August 25 ; a good commercial variety.

Wachusetts : Cane dull red, medium vigor, upright, hardy, not productive ; very few thorns ; berry of fine quality, medium size, 7-8 x 3-4 inch ; oblong-round ; season July 25-August 25.

Western Triumph: Cane dull red, strong, upright, hardy and very productive ; berry medium, 7-8 x 3-4, oblong-round, of good quality ; season medium, July 25-August 20 ; like the Snyder, it requires a damp bottom and close pruning.

Wilson's Early : Cane dark red, strong, upright, spreading, hardy and fairly productive ; berry large, 1 x 3-4, oblong-round, sprightly, rich, of good quality ; season medium, July 25-August 20.

Wilson's Junior : Cane reddish green, moderately strong grower, very spreading, vine-like, trailing, hardy and not productive ; propagates by tips or suckers ; berry medium, 7-8 x 3-4, oblong-oval, sweet ; season medium, July 25-August 20 ; without use to the commercial grower.

Charles Young (Algoma Station).

The hardiest that I have tested are the El Dorado and Agawam, but the amount of fruit obtained is so small that they are not worth growing. Blackcap raspberries are nearly as bad, besides no one cares for them, preferring the red and white raspberries, which have done very well. Loudon, on account of its extra hardiness, I prefer to any others I have tried, but it is a poor berry when compared with Brinckle's Orange for the table.

G. C. Caston, Craighurst (Simcoe Station).

Agawam and El Dorado are the two varieties for this section, and they have given excellent results. They have borne excellent crops of fine fruit every year, so that in my experience they are by far the most profitable of the small fruits grown here. I tested some 16 varieties before I got the right ones for this section, and I can confidently recommend these two.

Nursery agents have been selling blackberry plants through this section for years, but none of them ever seemed to succeed, for the simple reason that they were not suited to the locality. Now, since I have succeeded in producing large crops of these berries, there is a great demand for plants of these two varieties, and yet there are people who say that a fruit experiment station is of no use.

NOTES ON CHERRIES.

L. Woolverton (Maplehurst Fruit Farm).

On the whole, the season has been an encouraging one for cherry growers, for although some varieties of sweet cherries have given a short crop, there has been an abundant yield of sour kinds, and the price of these has been unusually high.

Yields. The following varieties have given a very poor yield during the past season, viz., Black Tartarian (almost a total failure), Elkhorn (rotted), Windsor (rotted). A very good crop was harvested from Knight's Early, Rockport, Wood, Cleveland, Napoleon, Montmorency, May Duke, California Advance, Olivet, Purity, and Reine Hortense.

Growth. The growth of the trees throughout the whole of the cherry plot has been unusually rapid up to August 15th, the best, indeed, that we have observed for years, due to such favoring conditions as abundant summer rains, thorough cultivation, freedom of the trees from the aphis, which some seasons is so abundant that the trees are much stunted thereby.

The Season. The first cherries of the season were Early Purple, of which the first picking was on the 12th of June; the last cherries of the season were English Morello, gathered on the 22nd of July, so that the whole cherry season lasted nearly six weeks. It is evident that by a judicious planting of varieties one might continue regular shipments of cherries to the markets during the whole of this period, and that the amateur could so select for his garden that his fruit dish could be constantly supplied during the whole cherry season.

The Rot. This fungus is the most serious obstacle in the way of the cherry grower, more especially of the Bigarreaus, which are especially subject. During the past season it has proved very disastrous, especially toward the end of June, on account of favoring climatic conditions. Rains were frequent, keeping the trees almost constantly wet, while at the same time there was much heat. On one occasion a heavy rain was immediately succeeded by a hot sun, and the rot spread with great rapidity among the Tartarians and Napoleons. One variety, however, seemed to be almost proof against rot, viz., the Knight's Early Black, a remarkable good cherry, and one which is most regular in its bearing habits, and of which the fruit seems never to need culling.

Insect enemies have been very few during the past season. The curculio was bad in the Belle Magnifique, which was almost worthless on this account, as, indeed, it has been for two years previous, but other varieties were remarkably free and perfect. The aphis did not show itself at all until the fruiting season was over, owing, no doubt, to careful spraying with whale oil soap, 20 pounds to the barrel. The kind used was sent us as a sample from New York City. This was more effective than the crude petroleum used in 1902 and much safer. In 1902 we used the latter, applying it very carefully with a fine spray. It did not entirely rout the aphis, and some injury to the trees was traceable to it.

Report on Varieties Fruiting, 1903, Trees 7 to 8 Years of Age, Unless Otherwise Specified.

Early Purple: Gathered June 12th; yield 15 qts. An enormous crop was set, and the trees were black with fruit, but the birds were most destructive, taking a great part of the fruit. The ten pound basket of these cherries sold for 60 cents each.

May Duke: Gathered June 17th; yield 21 qts.; ripened prettily and evenly, but birds took nearly one-third of the fruit.

Governor Wood: Gathered June 22nd; yield 5 qts.; from small sized tree; crop not heavy, about two-thirds; some rot; sold for about 60 cents per 9-qt. basket.

Cleveland: Gathered June 22nd, yield 5 qts.; no rot; more highly colored, a little sweeter, and a trifle softer than Governor Woods, in our opinion superior; an early and abundant bearer.

Rockport: Gathered June 23rd; yield of tree 40 years old, 65 qts.; usually badly affected with rot, but this year quite free, perhaps due to spraying with Bordeaux.

Ohio: Gathered June 23rd; yield 6 qts.; no rot; same season as Elton, smaller but superior.

Elton: Gathered June 23rd; yield 5 qts.; half rotted; birds took a large part.

Knight: Gathered June 25th; yield of tree 40 years old, 198 qts.; one of the best this season of all varieties; always profitable; a regular and abundant bearer; the fruit not subject to birds, rot, or Curculio.

Tartarian: Gathered June 26th; yield 3 qts.; a failure this season owing to rot and birds, giving less than one-quarter of a crop; the poorest cropper of all this season.

Reine Hortense: Gathered July 1st; yield 17 qts.; a fine crop of larger cherries than usual; in great demand about home, so many want it for domestic use, whether for canning, for pies, or, when dead ripe, excellent for eating with cream and sugar.

Royal Duke: Gathered July 2nd; yield 10 qts.; did not ripen evenly, and consequently it was necessary to make two pickings, at the second of which those left from the first were wonderfully improved; still, this uneven ripening is a serious objection in the commercial orchard.

Napoleon: Gathered July 23rd; yield of a 30-year-old tree, 135 quarts; fruit rotted very badly, fully two-thirds of the cherries being worthless; otherwise a large, fine cherry.

Empress Eugenie: Gathered July 4th; yield 18 qts.; a heavy crop of fine fruit, not subject to rot or to birds, and consequently valuable for the commercial orchard.

Olivet: Gathered July 4th; yield 17 qts.; usually rather a shy bearer, but quite productive this season; a favorite canning cherry.

Orel, No. 28: Gathered July 5th; yield 5 qts.; tree an early and abundant bearer, but a slow grower.

Black Eagle: Gathered July 5th; usually a very shy bearer, and therefore scarcely worth gathering, but this year it yielded about quarter of a full crop. The fruit was very fine and sold in the orchard at 75 cents for a nine-quart basket.

Yellow Spanish: Gathered July 6th; yield 3 qts.; a fair quality for the variety, for the cherries are usually thin on the trees, though the individual samples are very fine.

Early Richmond: Gathered July 6th; yield very good, but not equal to Montmorency, because cherry is smaller; tree not as vigorous as Montmorency, and needs good care and cultivation.

Purity: Gathered July 6th; yield 7 qts. from tree about four years planted. A fine cherry though a little softer than Montmorency; a good, regular bearer, and very promising.

Straus Weichsel: Gathered July 7th; yield 3 qts.; not productive enough to be profitable; fruits singly.

Red May: Gathered July 8th; yield 2 qts.; a promising variety, but rather small.

Black Knight: Gathered July 8th; yield 1 pt.; an improved Mazzard; a young tree, and its first crop.

King's Amarelle: Gathered July 8th; yield 9 qts. off five-year-old tree; a fine late Kentish cherry, but not so rich a red as Montmorency; very productive; one of the finest of its class.

Downer's Red Lane: Gathered July 9th; yield 7 qts. off a tree nine years old. Does not fruit in clusters, and therefore not as productive as some varieties.

Lutovka: Gathered July 15th; yield 5 qts.; one of the finest, largest, and richest colored of all the sour cherries; the fruit reminds one of red plums; flesh firm, and the variety is, therefore, a good shipper.

Montmorency Ordinaire: Same as Montmorency.

Montmorency: Gathered July 16th; yield 36 qts. from an eight year old tree. The best of all the sour cherries for the commercial orchard; color fine rich red. This season we had the finest crop of this cherry we ever had, the cherries were so large, and the trees were just red with the fruit, presenting a beautiful sight. These cherries sold unusually high this season.

Ostheim: Gathered July 7th; yield 18 qts. from a six year old tree; color too dark a red to sell at best prices.

English Morello: Gathered July 21st; yield 37 qts.; very productive, but did not take in the market as well as Montmorency; the dark red does not seem so attractive as the bright red to buyers of pie cherries.

California Advance: The finest Duke cherry in our collection at Maplehurst; the samples this year were very fine. The tree has proved an excellent bearer, beginning to crop after two years planting, and has not failed to produce a crop every year since.

G. C. Caston (Simcoe Fruit Station).

Of some forty varieties tested here, the one that stands pre-eminent so far is the Orel 24. It is a dark red cherry, nearly black when ripe; of fairly good size; of better quality than Ostheim, which it resembles in color; and a splendid canning variety. Most of the varieties under test did well, and appeared healthy for the past few years. But now many of them show sings of failure. Last year, as described in my report, a peculiar blight, or sporadic fungus, attacked the cherries, causing the leaves to turn yellow and fall off. Several trees died from the effects of this. Those were English Morello and Wragg, which is the Morello under another name. The other affected trees have recovered under a vigorous treatment with Bordeaux mixture, and have now apparently regained their normal condition; but they bore no fruit this year. The ones least affected, or immune from this attack, were Orel 24, which bore a crop this year; Ostheim, which also fruited a light crop; Bessarabian, Griotte du Nord, Brusseler Braun, and Litham.

Orel 24 is the one most highly recommended. It is one of the first planted in the experimental plot, in 1894, and, though not a vigorous grower, it remains sound and healthy, is not as liable to black knot as many of the others, and the fruit is better in quality than any I have yet tasted. The Montmorency is yet to be tried, being only planted this year. There is a rather difficult investigation required in the case of the different varieties of cherries here, and that is to what degree of temperature the fruit buds of each variety will stand without injury.

Charles Young (Algoma Fruit Station).

Cherries have been very satisfactory, except sweet cherries, of which I have only two Early Purple and one Yellow Spanish. The first is healthy, apparently, but no fruit yet; of the latter, the tree is tender, and this winter will, I think finish it. It may be possible to find something among the Dukes to take their place. In the meantime sweet cherries are not a success here. Sour cherries, 12 varieties by name, although I cannot distinguish that many by the fruit, have done extra well, planted in 1890 and later; they have had full crops this year. The three best are: E. Richmond, Montmorency, and English Morello. These are given in their order of ripening, and it takes them all to lengthen out the season. It is between Montmorency and Morello, which is most productive. I prefer the former, as the fruit is larger. Ostheim I cannot find a place for; it is a half dwarf, a shy bearer, and I see nothing to recommend it, unless it is to eat out of hand when fully ripe. It is then the nearest approach to a sweet cherry that I know of.

Harold Jones (St. Lawrence Station).

May Duke: A vigorous, upright grower, planted in 1897. Fruit buds tender; practically all of them being destroyed every year; useless for this section.

Montmorency: Planted in 1897; a very vigorous, spreading, handsome tree; fruit buds somewhat injured every year, but the tree produces a scattered crop of excellent fruit. If the fruit buds do not show better resistance as the tree attains age, it will have to be classed with varieties "not hardy" in this section.

Reine Hortense: Planted 1897; a vigorous, upright grower; fruit buds tender; not hardy.

Ostheim: Planted in 1897; a vigorous, spreading grower, inclined to droop; wood and fruit buds hardy; not a very heavy yielder, but moderate crops of fine fruit; a good cherry for pies and canning; desirable for this section, in fact, can be classed as very desirable.

Orel: Planted 1897; a moderately vigorous, spreading to drooping grower; very hardy in wood and fruit bud; has regularly borne crops since 1900 of medium to large sized fruit; bright red; very handsome, a first-rate canning and pie cherry. The best all round cherry yet tested.

Olivet: Planted 1897; a vigorous, upright to spreading grower, resembling Montmorency somewhat; not hardy in fruit bud; not desirable for this section.

Early Richmond and English Morello: Hardy in wood and bud for this section, and yield good crops, but are not as desirable as Orel and Ostheim when planted on clay soils; on sandy loams they are desirable varieties.

Select List of Cherries for Market.

Prepared by Mr. L. Woolverton.

Black Tartarian, Cleveland, Early Richmond, Elkhorn, English Morello, Governor Wood, Knight's Early Black, Late Duke, May Duke, Montmorency, Napoleon, Reine Hortense, Windsor.

CURRANTS.

A. W. Peart (Burlington Station).

Currants were a good crop, the black varieties doing especially well. No disease nor insect cut any particular figure, save the currant worm, which is always with us, but which is easily controlled by timely spraying. Blooming was about a week earlier than usual, while picking, owing to the cool summer weather, was somewhat later. The leaf blight, which last year affected such varieties as the North Star and White Imperial, did little damage this season.

These appear to be the best varieties for the planter: Red—Wilder, Cherry, Pomona, Red Victoria, Prince Albert, and North Star; black—Saunders, Naples, and Collins' Prolific; white—the Grape for yield, and the Imperial for quality.

We are disposed to omit the following from a commercial list: Belle de St. Giles, Raby Castle, Red Dutch, Versailles, and Champion. The first and last varieties are not sufficiently productive, while the other three are too small.

All the described varieties have reached bearing age.

Belle de St. Giles: Bush, weak, spreading; hardy, but not productive; leaves dark green; bunch long, compact; berry dark red, acid, large to very large, 1-2 to 5-8 inch, of fair quality; season, medium, July 10th to August 5th; large and showy, but a very poor cropper; yield per bush, 1903, 2 lbs.

Black Victoria: Bush, weak, spreading, hardy and productive; leaves, dark green; berry large, 1-2 inch, firm, sweet, of excellent quality; season, medium, July 15th to August 10th; yield, 6 lbs.

Brayley's Seedling: Bush of moderate vigor, upright, spreading, hardy and fairly productive; leaves, light green; bunch of medium length, loose and straggling; berry, dark red, medium size, 3-8 inch, very acid, sprightly flavor; season, medium, July 10th to August 15th; yield, 5 lbs.

Champion: Origin, England; bush, upright, vigorous, hardy, and moderately productive; leaves dark green; berry very large, 5-8 inch, black, sub-acid; season, late, July 25th to August 15th. Like Collins' Prolific, is a valuable cropper from year to year; yield, 5 lbs.

Cherry: Origin, Europe; bush, upright-spreading, vigorous, hardy, and very productive; leaves, dark green; bunch, short and compact; berry, dark, red, large, 1-2 inch, acid; season medium, July 10th to August 5th. Still a standard commercial currant; yield, 7 lbs.

Collins' Prolific: Bush very vigorous, upright, hardy, variable in yield; leaves, dark green; berry black, large to very large, 1-2 to 5-8 inch; sweet, sub-acid and firm; season, medium to late, July 20th to August 10th; yield 7 lbs.

Crandall: Bush, upright-spreading, very strong, vigorous, rampant, hardy, and moderately productive; leaves, very light green; bunch, short, compact; berry, variable in size 3-8 to 3-4 inch, bluish-black, thick skin, sweet, sub-acid; ripens unevenly, some of the later berries hanging until frost; season, July 20th to October; yield, 6 lbs. Said to be excellent for canning.

Fay's Prolific: Origin, New York; probably a cross between Cherry and Victoria; bush of moderate vigor, spreading, hardy, and fairly productive; leaves, dark green; bunch, long and loose; berry, large to very large, 1-2 to 5-8 inch, red, firm, and sub acid; season, medium, July 10th to August 5th; yield, 5 lbs.

Lee's Prolific: Origin, England; bush spreading, moderately vigorous, hardy and moderately productive; berry, black, large to very large, 1-2 to 5-8 inch, sub-acid; season, medium, July 15th to August 10th. This currant, like Fay's Prolific, requires careful cultivation; yield, 4½ lbs.

Naples: Origin, Europe; bush, upright-spreading, hardy, and very productive; leaves, dark green; berry, large, 1-2 inch, black, sub-acid; season medium, July 15th to August 10th. An old, reliable kind; yield, 5 1-2 lbs.

New Victoria: Bush spreading, very vigorous, hardy, and productive; leaves, green; bunch, long and loose; berry, red, small to medium, 3-8 inch, sub-acid, agreeable; season, medium, July 10th to August 5th; yield, 7 lbs.

North Star: Origin, Minnesota; bush strong, upright, hardy, and productive; leaves green; bunch, medium long, compact; berry red, medium to large, 3-8 to 1-2 inch, acid, sprightly; season, medium to late, July 15th to August 10th; a good late variety; yield, 7 lbs.

Pomona: Bush, medium vigor, upright, spreading, hardy and productive; leaves, dark green; bunch, long and compact; berry, medium to large, 3-8 to 1-2 inch, sub-acid, of fine quality; season, medium, July 10th to August 5th; very promising; yield 5 lbs.

Prince Albert: Bush, strong, spreading, hardy, and productive; leaves, dark green, large, and deeply serrated; bunch, short to medium; berry, small to medium, 3-8 inch, light red, very acid; season, late, July 15th to September 1st; yield, 6 lbs.

Raby Castle: Origin, Canada; bush, upright, very vigorous, hardy, and very productive; leaves, light green; bush, short, compact; berry, light red, small to medium; 3-8 inch, firm, acid; season, medium, July 10th to August 5th; yield 7 1-2 lbs.

Red Cross: Origin, New York; likely a cross between Cherry and White Grape; bush, spreading, vigorous, hardy and productive; leaves, green; bunch, short and compact; berry red, medium to large, 3-8 to 1-2 inch, firm, sprightly, sub acid; season, medium, July 15th to August 10th; yield, 6 lbs.

Red Dutch: Origin, Europe; bush, spreading, moderately vigorous, hardy and very productive; leaves, normal green; bunch, medium length, loose; berry, red, small, 1-3 to 3-8 inch, acid, of fine flavor ; season, early to medium, July 10th to August 5th ; yield, 9 lbs.

Red Victoria : Bush, upright-spreading, very vigorous, hardy and very productive; leaves, light green; bunch, long and loose; berry, medium to large, 3-8 to 1-2 inch, red, tenacious, firm and acid ; season, medium, July 10th to August 5th ; a good commercial variety ; yield, 9 lbs.

Saunders : Origin, Ontario ; bush, vigorous, upright-spreading, hardy and productive ; berry, black, large, 1-2 inch, sub-acid to sweet, fine flavor ; season, medium, July 15th to August 10th ; yield, 6 lbs.; an excellent variety.

Versailles : Origin, France ; bush, of medium vigor, upright grower, hardy, and moderately productive ; leaves, dark green ; bunch, medium length, rather compact ; berry, red, medium, 3-8 inch, acid ; season, early to medium, July 10th to August 5th ; yield, 5 lbs.

White Grape : Origin, Europe; bush, strong, upright-spreading, hardy, and productive ; leaves, green ; bunch, long and loose ; berry, white, large, 1-2 inch, sub-acid, pleasant flavor ; season, medium to late, July 15th to August 10th ; yield, 7 lbs.

White Imperial : Bush moderately strong, upright-spreading ; leaves, green; bunch, long and loose ; berry, white, medium to large, 3-8 to 1-2 inch, very sweet, fine quality ; season, medium, July 10th to August 5th ; yield, 5 lbs.

Wilder : Origin, New York ; bush, strong, upright grower, hardy, healthy, and productive ; leaves, dark green ; bunch, medium length, compact ; berry, red, tenacious, medium to large, 3-8 to 1-2 inch, sub-acid, of excellent quality ; season, medium, July 10th to August 5th ; promises well ; yield, 7 lbs.

A. E. Sherrington (Lake Huron Station).

The currant crop was very poor the past season ; in fact, the black currants were a total failure, owing to the frost at the time of blooming ; reds were only half a crop, but the demand was good, and prices quite satisfactory.

Black Victoria : Bush, strong, vigorous, and hardy ; yield, none.

Cherry : Bush, a slow grower, not as vigorous as Fays ; fruit, large ; color, red ; quality, good ; ripe July 14th ; yielded 17 oz. per bush.

Champion : Bush, a strong, vigorous grower ; fruit, large, black ; color, red ; yield, none.

Fays : Bush, strong and vigorous, hardy ; fruit, large, resembles Cherry ; color, red; quality, good ; ripe July 14th ; yield, 34 oz.; one of the best.

Naples : A very strong and vigorous grower, very hardy ; fruit large, black ; quality, best ; yield, none.

North Star : Bush, slender and spreading ; fruit, small ; color, red ; quality, poor ; ripe, July 14th ; yield, 37 oz.; too small to be profitable.

Pomona : Bush, a compact grower, only partly recovered from the blight of last year ; fruit, medium to large ; color, red ; quality, best ; the sweetest currant grown ; ripe July 15th ; yield, 16 oz.

Prince Albert : A strong, compact grower, with beautiful foliage; hardy and healthy; fruit, medium to large ; color, red ; quality good ; ripe July 18th ; yield, 87 oz.

Red Cross : Bush, a good grower, apparently hardy; fruit large; color, red; quality good ; ripe July 14th ; yield, 10 oz.; first year of fruiting.

Raby Castle : Bush, very vigorous and hardy ; fruit, small and very tart ; color, red ; ripe July 15th ; yield, 15 oz.; very productive.

Versailles : Bush, vigorous and hardy ; fruit, large ; color, red ; quality, good ; ripe July 14th ; yield, 58 oz.

White Grape : Bush a good grower, and hardy ; fruit, large, color, white ; quality good ; yield, 27 oz.; first year of fruiting.

Notes by Chas. Young, Richards' Landing (Algoma Station).

Currants find their ideal climate here, and I cannot say that any of those I have tried are superior to any others, the only requirement seems to be a fair amount of cutting out the old wood, and plenty of manure. Perhaps White Grape, if the color is not against it, will yield more fruit than any other. Gooseberries, which were cut out very severely last spring, gave 29 qts. to the bush. It is between Pearl and Red Jacket, which is the best, although Downing is close up to either of them.

GOOSEBERRIES.

Stanley Spillett, Nantyr, Ont.

Red Jacket has again borne a large crop of splendid fruit, but just as they began to ripen, every berry fell from the bushes. Prof. Hutt's visit to the station was opportune; he saw the bushes when about half the fruit had fallen. He instructed me to partly fill a glass jar and watch results. I did this, and in 48 hours the sides of the jar were covered with grubs. I had before concluded that this was the cause of the fruit falling. I visited every place here where gooseberries are grown, and found the same state of affairs, all the fruit down. This falling of the gooseberry has been going on for three or four years. E. D. Smith, M.P., of Winona, wrote me two years ago that Pearl, Red Jacket (Josselyn), and Downing were falling badly with him. Seven years ago the fruit fell badly, but ceased the next and following year, to any great extent. Until this season the English, or foreign, varieties were not attacked, on account (I presume) of their thick skin.

Downing, Pearl, and Champion bore a medium crop of fruit this season, but all fell off

Whitesmith and Columbia, of the large varieties, with Autocrat, set a medium crop, but fell off; Autocrat never fails to bear big crops of fruit, but it is certainly very inferior in quality.

Having provided myself with an auto-spray, I did not use my big pump at all (Aymer). I sprayed after every shower with liver of sulphur, in all the times. Foliage and tips of young growth of wood continued to mildew throughout the whole season, so that the growth of new wood was very small, and half the length of every sucker bare and dead. The fruit up to the time of falling was perfectly clear of mildew.

GRAPES.

M. Pettit (Wentworth Station).

The grape crop this season has been much lighter than usual; several varieties did not fertilize; the weather during blooming season was cold. With that exception there was little difference from ordinary years. Good, strong, self-fertilizing varieties, such as Champion, Worden, Delaware, Niagara, Concord and Catawba, bore fair crops of well-ripened, good-flavored grapes.

Some of the varieties that do not fertilize well, such as Massassoit, Lindley, Salem, Brighton, Moyer, and several of the newer kinds, planted for experimental purposes, although they bloomed freely, set very little, and some of them no fruit.

This season's experience proves more conclusively that very few of the newer kinds are of much value: Campbell's Early is about the only exception.

Experiments in cheapening the cost of production by different systems of cultivation have been tested for three years.

The usual system has been to plow from the vine in spring; cultivate and plow to them again in July. Part of our vineyard has been treated in this way. Part of it has been fall plowed to the vines and cultivated during summer; a part has had surface cultivation only for three years, and this has given the best results. Shallow cultivation, allowing the rootlets or feeders to come near the surface, and cultivating the earth to and from the vines, with the Corban harrow and grape hoe, which is less than half the expense of plowing, has given better crops.

Below is a short description of the growth, productiveness, etc., of some of the newer kinds, as tested here:

Amber Queen: Good quality; fairly productive; of some value.
August Giant: Very large, black; productive; fair quality; too tender to ship.
Arnolds: Productive; poor quality.
Alvey: Small; poor quality.
Black Delaware: Good quality; vine lacks vigor.
Black Eagle: Early; does not fertilize well; no value.
Bacchus: A wine grape of Clinton type.
Bockman: Small pink; vine vigorous; clusters too small and loose.
Bell: Too tender; vines winter killed.
Black Pearl: Very productive; sour; Clinton type.
Campbell's Early: Large; very early; fair quality; productive.
Canada: Productive; black grape; poor quality.
Cambridge: Much like the Concord in every respect; no better.
Carman: Vigorous vine; not productive.
Croton: White grape; good flavor.
Concord Muscat: Large; white; productive; fair quality.
Concord Chasselas: White; good flavor; vine lacks vigor.
Cottage: Black; Concord type; berries drop from the bunch.
Cynthiana: Good wine grape, of Clinton type.
Cunningham: Clinton type.
Dracut Amber: Productive; poor flavor.
Duchess: Small; white; good quality; long keeper.
Dr Collier: Resembles Concord; not as productive.
Eldorado: White; good flavor; not productive.
Eaton: Large; black; medium quality.
Esther: White; very weak vine; of no value.
Etta: White; productive; poor quality.
Elvicand: Black; vigorous vine; no value.
Early Ohio: Early; black; vine lacks vigor.
Early Golden: Winter killed.
Early Victor: Black; productive; of some value.
Eumedal: Winter killed.
Elvira: White; very productive; poor quality.
Faith: Weak; vine of no value.
Florence: Very early; small; no value.
Green Mountain: White; early; good quality; lacks vigor.
Green's Golden: White; poor quality.
Golden Drop: Very small; no value.
Geneva: Winter killed.
Grayson: Very weak vine.
Herman: White; productive; fair quality; large.
Hayes: White; too tender.
Herbmount: small, black wine grape.
Ives: Small, dark grape; poor quality.
Jefferson: Fine flavor; red, compact bunch; vine lacks vigor.

Janesville : Very early ; sour.
Lady Washington . White ; large ; late ; no value.
Lutie : Large ; productive ; very musky.
Martha : White ; weak grower ; no value.
Missouri Reisling : White ; productive ; a wine grape.
Marion : Black ; very productive ; sour; Clinton type.
Mills : Fine, large, late keeping grape ; good quality ; vine lacks vigor.
Montefiore : Dark color ; a wine grape.
Monroe : Black ; small ; weak grower.
Mason Seedling : Very good ; white.
Norton's Virginia : Wine grape ; poor flavor.
Olitie : Winter killed..
Opal : White ; productive ; poor flavor.
Oneida : White ; very productive ; late.
Poughkeepsie Red : Winter killed.
Presley : Amber ; Amber ; small ; vigorous vine.
Requa : Good Red Roger ; productive ; long keeper.
Romell : White ; not much value.
Rebecca: White ; very slow grower ; no value.
Taylor : White ; small ; not productive.
Triumph : White ; large ; late ; sour.
Transparent : White ; no value.
Ulster Prolific : Winter killed.
Woodruff Red : Large ; productive ; medium quality.
Wyoming Red : Productive ; medium size ; inferior quality.

L. Woolverton (Maplehurst Fruit Farm).

The Lindley Grape.

A few years ago the Lindley, or Rogers' No. 9. was a favorite red grape with vineyardists. and it was planted quite freely in commercial vineyards. It was also a favorite for the dessert table, for its quality is excellent. and its pretty and peculiar red color shows up its bunches finely on the dessert dish, along with Niagara and Concord, making a display of emblematic colors, the red, white and blue.

In some instances vineyards of Lindley have yielded splendid crops, amounting in one case to an average of about thirty pounds to the vine ; but it was not long before the variety began to fail in productiveness, and to become unprofitable. Perhaps this failure was due to the thrip, which is very troublesome on vines of the Lindley, for they weaken them by sucking the sap from the leaves. Anyway, whatever may be the reason, we find that of late years our Lindleys never give a good yield of fruit, and it is very difficult to select out bunches that are really perfect. We cannot, therefore, recommend the Lindley as a market variety, and, since it is scarcely the equal of the Delaware in quality, it cannot displace that excellent little grape for the dessert table.

Perhaps if we could succeed in destroying the thrip this grape might recover the place it held when President Wilder, of the celebrated Massachusetts Horticultural Society, denominated it and Jefferson "the Muscats of America," and when in the Bushberg catalogue it was recommended as a "fine table grape, one of the best of the red hybrids.

It was on the encouragement given by such favorable statements that about ten years ago we planted a vineyard of Lindleys at Maplehurst, but every year they have been growing less satisfactory, until now we expect soon to be obliged to root them out, for they are only a breeding space of thrips, which swarm over to the other varieties.

Lindley is an excellent keeping grape, holding its rich flavor in ordinary storage, well into the winter, and in a dry atmosphere it turns almost to a raisin.

There is a grape called Mary in our collection which very closely resembles Lindley, so closely, indeed, that experts are puzzled to decide whether it is really distinct or not. We notice, however, that it is a better grower, and that bunches are more compact, and, if anything, brighter in color. Perhaps it may prove better able to resist the vexatious thrip than the Lindley, and, if so, it will establish its distinct identity.

The Brighton Grape.

For the dessert table nothing is a more attractive ornament than a fruit dish piled with a choice asosrtment of delicious grapes, fresh and plump from one's own garden, and appetizing by reason of their beauty. A garden of well-chosen varieties would furnish the owner a constant change of kind and color ; or, if he prefer it, a loyal blending of the red, white and blue.

Money cannot always command from the fruiterer that fresh condition, that perfection of beauty or that delicacy of flavor, that is to be found in grapes from one's own garden, where one may gather the fruit with his own hand just as it reaches the point of perfect maturity. And, as for the grapes offered for sale in the markets, although they may be cheap in price, they have come many a mile and met with much rough usage, and, therefore, cannot compare in value with the home-grown samples. From these considerations we do not hesitate to advise every reader, who has even the smallest city back yard, to plant a few vines for the supply of his own table. They will creep over an unsightly old fence, a barren wall or a back verandah, and thus prove ornamental as well as useful.

Among the valuable red grapes for dessert, we place the Brighton, which takes its name from the town of Brighton, N.Y., the home of its originator, Mr. Jacob Moore. He raised it from the seed of Concord, fertilized by Diana-Hamburg, so that it is one-quarter European, and to this no doubt is due both its delicate flavor and its slight tendency to mildew ; while to its Labrusca, or American Fox grape, relationship we may credit the vigor of the vine, and its large, thick, dark green foliage.

The Brighton, when eaten just at maturity, is sprightly, somewhat aromatic and delicious ; the pulp separates readily from the seeds without impairing the flavor. When first ready for use the color is a light red, but if left very long on the vines the color changes to so dark a crimson that it is hard to recognize it as the same variety, while its quality also deteriorates.

In season of maturity the Brighton is somewhat in advance of the Delaware, so that, of its season, it may fairly be reckoned the best red dessert grape. No one, therefore, who is planting a small collection of grapes for his own table, should omit a vine of the Brighton ; and, if he will take the trouble to remove the small, imperfect bunches in the early part of the season, he will have some magnificent clusters in September for the decoration of his fruit dish

We do not commend the Brighton to the planter of a commercial vineyard ; and, unless we are much astray in our interpretation of the signs of the times, the time is not far distant when the great Northwest will be the chief market for Ontario grapes, and, therefore, we must plant most largely of such varieties as carry well and keep for a long time in first-class condition.

M. Pettit, Winona, Ont. : The Brighton is not a favorite red grape with those who grow extensively for market in this section It does not sell as well as Red Rogers, is fully as subject to mildew, and does not bear regular crops. If heavily laden one year it will be light the next, and if allowed to hang on the vines after it is ripe it loses its sprightly flavor. I think Lindley, Agawam and Delaware are much better.

F. W. Broderick, St. Catharines : The Brighton grape may well be classed as one of our best commercial varieties. It is a good, vigorous grower, and a productive bearer. It is a grape of excellent quality for dessert, and always meets with a ready sale on the markets. It ripens in good season, and is very rarely injured by fall frosts in our locality. It grows well on sandy loam or light gravelly soil, but may be grown with success on heavier soils.

A. W. Peart, Burlington, Ont.: I have about 60 vines of Brighton, eleven years old, and do not consider them as desirable and profitable as some other varieties. It is not so productive as the Worden or Concord, and, although of fine quality, its color—a reddish purple—is not distinctive enough to give it a higher price than the black variety unless it be known to the consumer. It is also subject to mildew.

T. H. Race, Mitchell, Ont.: Quite early in the eighties the originator sent me two vines of the Brighton grape to see how they would do in this locality. I have grown them ever since. The vine is a good grower, fairly hardy, but not what I would call a heavy bearer. The fruit ripens before the Concord, and is of better quality. I have it growing side by side with the Amber Queen, but it is not as strong a grower, nor as heavy as the latter. With me the Amber Queen has never mildewed, and in growth and bearing qualities it has always outstripped the Brighton, and for this section I would consider it a preferable grape. The Brighton, however, is a trifle earlier, a larger bunch, and somewhat more attractive in appearance.

W. T. Macoun, C.E.F., Ottawa: There are several varieties of grapes which ripen earlier than the Brighton at Ottawa, but the latter will ripen if the season is fairly favorable. If I were planting six varieties for home use here it would be among them. When mixed with other varieties which bloom at the same time, the fruit sets well, and there is a good crop of it. The quality is very good, and, even if the fruit is not thoroughly ripened, as is sometimes the case here, it is usually palatable, as it becomes sweet before being quite mature.

W. Cox, Collingwood. The Brighton does well here. I have grown it about 18 years, and I have never laid it down a winter yet. It bears well, and the fruit is of such good quality that anyone who buys them once is always ready for them again. I think a good deal of the Brighton.

W Warnock, Goderich: I consider the Brighton the best dessert grape in its season of all the American grapes. It is one of the strongest growers, and produces very large bunches and plenty of them. The berries are extra large, dark red, of the finest flavor when used as soon as ripe, but they lose their rich flavor very soon after they ripen, so they should be used quickly after they become ripe. The vine is quite hardy with me, and a regular cropper. I am sure no one will ever regret planting a vine of Brighton if they live to taste its fruit.

The Niagara Grape.

For this grape we find plenty of admirers in the warmer sections of our Province, where it ripens its fruit to perfection. For example, Mr. E. Morris, of Fonthill, writes:

"In reply to your inquiry, I would say the Niagara grape is the best all round white grape grown in this section. It is also being used quite extensively for a wine grape, buit I do not consider it a first-class grape for that purpose, as it gives the wine a foxy flavor."

Charles Young (Algoma Station).

The Concord colored this year, but was not ripe. I am satisfied we will have to look further south for our supply. Even when they do ripen here they are not fit to eat.

A. W. Peart (Burlington Station).

Barry: Vine vigorous and productive; bunch, large, fairly compact; berry, large, black, of fine quality; season, middle of September, about the same as Concord.

Catawba : Vine, very vigorous and productive ; bunch, medium size, fairly compact ; berry, medium to large, red, of fine aromatic flavor ; season, rather late, early October.

Pocklington : Vine, a moderate grower and productive ; bunch, large, shouldered, very compact and handsome ; berry, large, yellowish white, of fair quality ; season, middle of September.

Massassoit : Vine, fairly vigorous, hardy, healthy, and moderately productive ; bunch, medium size, somewhat loose ; berry, large, light red, of good quality ; season, early September

PEACHES.

W. W. Hilborn (Southwestern Station).

For market purposes the yellow-fleshed varieties are in demand almost to the exclusion of those with white flesh. I find on enquiry that quite a large number of the consumers have never tried canning the white-fleshed sorts. In our own family we prefer them to the yellow. One difficulty in the way of white-fleshed peaches ever becoming popular is that they do not stand shipping as well as the yellow-fleshed kinds ; on this account buyers have been prejudiced against them. They are not popular with the growers on acount of the extra care required in marketing.

Sneed : First to ripen, but is small and rather of indifferent quality and appearance ; valuable only to a limited extent for first early ; several days ahead of Alexander.

Alexander : This is still the leading variety for first early market. When well grown it is of fine appearance, and sells well to those who have never previously used it. It is usually sent to market while quite firm. If it is left on the tree until ripe it does not stand shipping ; therefore, it must be picked while yet hard. The purchaser is apt to be disappointed, as it is not as good as its appearance would indicate ; on this account it has greatly injured the trade in early peaches. It is a mistake for any grower to plant largely of any variety that will not give satisfaction to the consumer, as this will undoubtedly lower the price of any good sort that follows just after.

Greensboro : Perhaps the best of the first early kinds. It ripens a little earlier than Rivers, is as large, and less liable to rot.

Triumph : The first yellow-fleshed peach to ripen ; when well grown it is of good size and fine appearance. It suffers considerably from rot. It must be thinned severely, otherwise it is too small. It cannot be recommended for general planting to any great extent in commercial orchards.

St. John : This is the first really first-class variety to ripen that I have grown. It is as fine in appearance as Early Crawford, and of as good or better quality. My first shipment of it was made this season, August 21st, a week in advance of Early Crawford. The tree is about as hardy and productive as the above standard variety. One of the most valuable for the commercial orchard.

Fitzgerald : A few days later than Early Crawford ; hardier in fruit bud ; of better quality, and, taking all things into consideration, one of the most profitable sorts grown in this district for either home use or for market.

Brigden, or Garfield : Of the Early Crawford type ; ripens a little in advance, and in some respects is an improvement on the old variety.

New Prolific : A peach that succeeds well on sandy soil, but not as satisfactory on clay loam. It is very hardy and productive ; fruit of the Crawford type ; ripens a week later than the above, and is very profitable for the commercial orchard when grown on suitable soil.

Elberta : No peach of recent introduction has been planted to such an extent as this sort. The tree is not as vigorous and hardy as many other varieties ; is more subject to leaf curl than most kinds, and the fruit sometimes spot badly. When well grown it has the best shipping qualities of any of its season, which is between the two Crawfords.

Engol Mammoth: Another peach of the Early Crawford type, that ripens before the middle of September. It has been one of the most profitable sorts I have fruited. It is of good quality, large size, and less liable to rot than most varieties. On this account it is valuable for shipping to distant markets. It is one of our best market peaches for all purposes.

Banner: This ripens just before, or with, the Smock. It is a new variety that originated in this county (Essex), and has been very largely planted by many of the leading fruit growers. The tree is very hardy and productive. Fruit medium to large, of very fine appearance: yellow, with red cheek. It colors up better than most late peaches; also of better quality. Should it continue as profitable on further trial than this, its first season in fruiting on a large scale, it will become a standard variety of more value than any other sort we have ripening at the same time.

Bronson: This ripens about the middle of September, or a little later. It is of good size, yellow, with slight blush on the sunny side; a splendid variety for canning purposes Tree very productive, vigorous and hardy.

Golden Drop: Similar to the above, but a few days later.

Kalamazoo: Another of the same type, that ripens with, or just following, Golden Drop. The three last named are all valuable for the commercial orchard, on account of their hardiness in both tree and fruit bud, and the large crops they produce annually.

Smock: An old variety, which has not been displaced by any of the newer introductions, and is to-day the most popular late peach we have.

Salway: This is the latest sort we can plant, with any assurance that its fruit will ripen in this district. It does not always come to full maturity. It will ripen about four years out of every five. It has produced some of the most profitable crops ever grown in this locality. It sometimes cracks and spots quite badly.

John G. Mitchell, Clarksburg (Georgian Bay Fruit Station).

We have had most signal success with our peaches, both this and the previous year Every tree on the station grounds was loaded full, and brought to maturity a fine crop of fruit. The varieties are: Red Canada, Fitzgerald, Tyhurst, Triumph, Bowslaugh's Late, Crosby, Champion, Capt. Ede, and Wonderful.

A. W. Peart, Freeman (Burlington Fruit Station).

Champion: Tree strong, vigorous grower, as well as productive; fruit, large to very large; flesh white, semi-cling; quality good; season, last of August.

Greensboro: Tree a moderate grower; fruit, medium, white flesh, cling, of fair quality; season, early August.

Longhurst: Tree, a moderate grower; fruit, medium, yellow flesh, skin yellowish pink; freestone; of good quality; season, middle of September.

Sneed: Tree, a moderate grower; fruit, small to medium, white flesh, cling; of poor quality; season, late July.

Triumph: Tree, moderate grower; fruit small, skin very red, flesh yellow, cling; season, middle of August.

Tyhurst: Tree, a moderate grower; fruit, small, yellow flesh and skin; quality, good: a freestone.

Varieties recommended for planting mentioned in order of ripening.

(Prepared by Prof. H. L. Hutt.)

1. Alexander, white-fleshed; clingstone.
2. Early Rivers, white-fleshed, semi-cling; for home use or near market.

3. Hynes, white-fleshed ; semi-clingstone.
4. Triumph, yellow-fleshed ; semi-clingstone.
5. St. John, yellow-fleshed : freestone ; good quality.
6. Champion, yellow-fleshed ; freestone ; for home use or near market ; good quality.
7. Brigden, yellow-fleshed; freestone ; good quality.
9. Fitzgerald, yellow-fleshed ; freestone ; good quality.
10. Reeve's Favorite, yellow-fleshed ; freestone ; large size ; fair quality.
11. Elberta, yellow-fleshed ; freestone ; fair quality ; good shipper, but subject to leaf curl.
12. Old Mixon, white-fleshed : freestone : good quality.
13. Late Crawford, yellow-fleshed ; freestone : good quality.
14. Stevens, white-fleshed ; freestone ; good quality.
15. Smock, yellow-fleshed ; freestone ; very late ; fair quality ; good shipper.

PEARS.

R. L. Huggard (East Central Station).

Bartletts were a light crop, and ripened prematurely, and began to decay very soon after gathering, largely owing to the very hot and sultry weather just at the time of maturity. Clapps did fairly well ; Louise bore a light crop of fine fruit ; Seckel yielded well and sold for highest price ; Kieffers yielded best of all, but are not sold yet ; those that were thinned are very fine and large ; it pays to thin Kieffers ; Anjou bore no fruit this season; Angouleme, Precoce, Clairgeau, Tyson, Howell, Jules Guyot, Compte de Paris, Rutter, Lecounte and several more varieties yielded excellent crops of fine sample sof fruit.

I followed clean cultivation throughout the season, and ridged up the ground for winter. All the trees made a vigorous growth, and have ripened their fruit buds well. There was no spotted or scabby fruit this season, but the codling moth got in its work and quite a number of wormy apples are the result ; although every tree was carefully sprayed four times, and some of them five times.

We applied barnyard manure, with ashes as top dressing, with good results. Pruning was commenced in March and finished April 20th. Fruit of all kinds has been good in this section, and prices have kept low, and labor scarce and wages higher than usual.

In the new varieties of pears I find the following equal to, or surpassing, most of the older varieties, viz.: Compte de Paris, larger and better than Bartlett ; Comice, Dr. Jules Guyot, Duchess, Precoce, Dorset, Worden, Seckel.

A. W. Peart (Burlington Station).

Trees have been very free from blight this season; neither has the scab done much damage. Owing to the scarcity of labor, infrequent cultivation here, may, in a measure, account for this.

Easter Beurre : Planted 1897 ; tree a spreading, stocky, sturdy grower, with branches somewhat straggling and wild ; fruit large, 3 1-2 x 3 inches, and often larger, roundish ovate ; green, thick skin, with russet dots, fine in grain, rich, juicy, solid and heavy ; stem medium length, deep basin, deep, narrow cavity ; season late winter, keeps until April under ordinary conditions. Its cropping qualities are yet to be seen. It seems to blow off rather early.

Josephine de Malines : Planted 1896 ; tree spreading, moderately vigorous, hardy and productive; fruit conic obovate; green skin, sometimes showing russet, medium size, 2 1-2 x 2 1-2 inches, melting and sweet ; stem long, basin deep and cavity light ; begins to fruit young ; season, early winter.

Lawson: Planted 1896; tree upright, moderately vigorous; fruit medium size, 3 x 2 1-2 inches, roundish, pyriform, yellow skin, with bright red cheek; quality fair; season early August.

Sudduth: Planted 1897; tree spreading, vigorous; fruit small to medium, 2 1-4 x 2 1-4 round, with thick skin; flesh soft, coarse, of poor quality; basin and cavity shallow; stem long; season November; little to recommend this pear.

Wilder: Planted 1896; tree an upright vigorous grower; fruit obtuse, pyriform, medium size, 3 x 2 1-2 inches; skin splashed with red; flesh fine in grain, tender, juicy melting, rich and sweet; not so productive, but of better quality than the Giffard; season middle of August.

Winter Nelis: Planted 1896; tree a spreading, straggling, short-pointed, stock grower; begins to bear young, and is very productive; fruit medium; size 2 1-2 x 2 1-2, roundish, obovate, russet; skin fine grained, juicy, rich, and very sweet; basin medium; cavity light; season December.

Bourgeat Quince: Planted 1896; tree a light, spreading grower; fruit large, 2 1-2 x 3 1-4, yellowish orange, pyriform; basin and cavity deep; quality good; season November.

The French pears planted in 1900 are all living and growing well, but thus far have borne no fruit.

Charles Young (Algoma Station).

Pears are better this year than formerly, but I do not think they will ever be a success commercially in the North. Keiffer bore a large crop of undersized fruit; Flemish Beauty a very few; both were planted in 1899. Bessemianka, planted two years ago, had a few specimens of poor fruit, which began to rot at the core before the fruit ripened. There are some varieties under test here. The wood of all seems hardy enough. Perhaps they may do better in time in the way of fruit.

G. C. Gaston (Simcoe Station).

Though not one of my specialties, I have several varieties of pears on trial. The Flemish Beauty is quite at home here, but of late years has been so affected by the scab that Bordeaux mixture failed to prevent it. This year, however, it is clean and good, and I am of the opinion that when you get it free from scab there are few better pears either for canning or dessert. I am using it, however, as a stock for top working other varieties on such as Bartlett, Anjou, Clairgeau, Duchess, and others. This experiment is working satisfactorily so far. I consider it a waste of money and time to buy and plant dwarf pears in this locality; they are almost sure to fail. I recommend planting hardy standards, such as Flemish Beauty or some of the Russian varieties, and to top graft on those the varieties you wish to grow.

Keiffer flourishes almost anywhere through this country, but I consider it a sort of an outcast, only wanted when no others are available. When you see it quoted at $2 per barrel, and at the same time other varieties are quoted from $4 to $6, there is something seriously wrong with the quality.

Trees of Clapp's Bartlett, Anjou, Idaho, Vermont Beauty, and others, are doing well at this station, and it is possible we can grow almost any variety of standard pear as well as they can be grown further south.

The French pears received three years ago are all growing and doing well. One of them bore a few specimens this year, but they were small and of poor quality.

There was added to the list this year two varieties, the Hoosic and Wilder.

John G. Mitchell (Georgian Bay Station).

All varieties of bearing age have done well this season. Some trees of Anjou, Clapp's Favorite, Duchess, Bartlett and Clairgeau were a pretty sight, bending and drooping with their loads of large, clean fruit. Quite a large number of young trees in the experimental plot are showing fruit; amongst them are Boussock, Malines, Souvenir de Congress, Dempsey, and Winter Nelis.

The young trees received from France are now set out in the orchard, and all are living and doing well In a few years they will make a most interesting collection.

Harold Jones (St. Lawrence Station).

Clapp's Favorite: Planted 1896; a vigorous, strong grower, and very healthy so far. This is the second year of fruiting; fruit is large size and very handsome, quality excellent; gives promise of being desirable for this section.

Clairgeau: Planted 1896; has made a feeble growth, but is now dying with blight; top grafted on Bessemianka it is doing well, and has fruited once; not desirable on its own roots; promising top grafted on hardy stock.

Flemish Beauty: Has again produced fruit of excellent quality and appearance, This pear is undoubtedly the best pear grown in this district, notwithstanding reports to the contrary, I find no difficulty in keeping this fruit free from spot by spraying with Bordeaux mixture; early and frequent sprayings are essential. If the fruit and foliage is kept absolutely clean up to June 15th, there is no further trouble, but late sprayings avail very little if the early spraying is neglected.

Hamell: Planted 1896; gave a crop of large handsome fruit in 1902, but the trees are now dying with blight.

Ritson: Planted 1896; a strong, viogrous, upright grower; healthy; a small crop of medium-sized fruit of good quality. This variety gives promise of being a success here, and may be recommended for general planting for home use.

Keiffer: A hardy, annual bearer, that succeeds well here; the fruit does not attain the same size and perfection as in Western Ontario, but may be grown successfully for home use as a cooking pear. If picked about the 10th of October and allowed to ripen in a dark place, they will put on a handsome coloring, and are fair as a dessert pear.

Sudduth: Planted 1897; this pear came to me under seal; a strong moderate grower; healthy; fruit medium size, pale yellow; quality poor; of very little value.

Koonce: Planted 1897; has produced a few samples each year, fruit large, similar in form to Bartlett; of very poor quality.

Lincoln: Planted in 1895; fruited three years; yield this year was three pecks to the tree; fruit medium size and of fair quality.

Dr. Jules Guyot: Planted 1895; commenced fruiting second year and has borne a fair crop every year since, of large handsome fruit, similar in form to Bartlett, quality only medium.

White Doyenne: Planted in 1895; has made good growth, but produced very little fruit.

Keiffer: Planted 1895; has made the most vigorous growth of any variety of pear in the plot; produced three bushels to the tree; 75 per cent. No. 1.

Summer Doyenne: Planted in 1895; fruiting for three years; average, one peck to the tree this year; ripened early.

Beurre Giffard: Planted 1895; has fruited for some years; had a few specimens this year; ripened last of August.

Winter Nelis: Planted 1895; has fruited sparingly for four years; one peck this year; medium size; tree drooping; has made good growth.

Margaret: Planted 1895; fruited two years; requires to be picked very early; decays at core if left on the tree to ripen.

Idaho: Top grafted 1895; loads sparingly each year; similar in form to Sheldon, but with less russett color; of good quality.

PLUMS.

John G. Mitchell (Georgian Bay Station).

The object of this report is to answer desired information for the general benefit of planters, rather than to give detailed descriptions of individual varieties. Plums have been an enormous crop throughout this district, so much so, that many thousands of baskets were not gathered at all, but left to spoil in the orchards. On the station grounds alone fully one thousand baskets were allowed to go to waste, not salable at prices which would pay expenses, and the strangest thing about it was that there were less plums shipped from here than in many a former year. Now, there must be some reason for this. During the summer I went to a great deal of trouble to find out, if possible, what the great buying public most demands and appreciates. I interviewed dealers, traders and canners, and they all with one accord condemn the Japan plums on account of their poor quality. The dealers do not want them, because when known they will not sell.

Our traders, who distribute thousands of baskets along the north shore of Georgian Bay and Lake Huron, as far as Sault Ste. Marie, do not want them, and some of them won't buy them at all.

The canners say they are of poor quality, and put up a very poor class of goods, and as a canning firm's reputation stands on his brand, they must have plums of good quality. They pay ten to fifteen cents more per bushel for the yellow European varieties than for the colored blue and red plums. Now, the reason for such low prices may be partly that a lot of poor stuff going forward which is not wanted must reflect against the sale of something better. This has been my own opinion. I always said, Go slow with Japan plums. If I were planting a plum orchard again, and I likely will, I would not put a Japan variety in it, unless it would be Red June, and then very sparingly.

European Plums.

After several year's test, these seem without doubt destined to be the plums for the commercial orchards of Ontario. The following have been thoroughly tested here: they are sufficiently hardy, good growers and bearers, and of admirably quality: Washington, Imperial Gage, Brashaw, Quackenbos or Glass, Prune d'Agen, Arch Duke, Diamond, Monarch, Montreal, Yellow Egg, Pond's Seedling, Coe's Golden Drop, Reine Claude, Whitby, German, and Baker Prunes. These are the cream of all our 170 or more varities, so far as we know at present. Red June, a Japan, on account of its earliness, may be added to this list.

Japan Plums.

There already seems to be too many Japan plums planted. Although quite hardy, rapid growers, good bearers, and of most attractive appearance, their quality, as compared with the best Europeans, is so poor that there is not much demand for them where they are well known.

The following are the best quality and most desirable of all we have in test: Burbank, Chabot, Red June, and Satsuma or blood. Wickson, the best in quality of all the Japan, is apparently too tender. I am told that it does not succeed well even in Southern Ontario.

American or Native Plums

of which we have quite a number, are of no practical value for the commercial orchard. We occasionally ship a few baskets to try how they sell. They were invariably not sold, or sold for less than expenses. Stoddard, Milton, Cheney, Chas. Downing, Forest Rose, and Wolf appear to be about the best we have, and might be of some use where it might be too cold for the Domestica to succeed.

W. W. Hilborn (Southwestern Station).

Varieties of Japan Plums.

Willard: This was the first to ripen, but the fruit is of such poor quality that it is of no value.

Red June: This is the earliest good sort, perhaps the most profitable, on account of its early ripening, fine appearance, and of rather good quality.

Abundance: Ripens soon after the above, of some value for dessert, but of no value for canning.

Burbank: Several days later than Abundance; of little value for dessert, but good for canning purposes.

Satsuma: This is my choice of all the Japan plums I have seen. It is gaining in popularity where best known. For canning purposes it has few equals. This season I found it easier to sell this sort at 25 cents per 12-quart basket than to give away Lombards, which were ripe at the same time.

Wickson: A variety of some promise on account of its fine appearance and large size.

Climax: This is the most promising of all the newer Japans I have tested. On young trees it produced a heavy crop of fruit that ripened with the Abundance; of about the size and form of Wickson, but much darker in color.

Chabot: This resembles Abundance, ripens later, not of as good quality.

Hale: A plum of fine appearance and rather nice in flavor; has some value for dessert; rots badly; of no value for market.

Juicy: A very strong grower; produces but little fruit; of no value.

Berkmans: Tree and fruit resembles Burbank, but not of as good quality, and ripens later.

A number of other varieties have ripened a few specimens, but none of them gave promise of any special value.

In my opinion, it will be easy to overdo the planting of Japan plums. My choice for market purposes are: Red June, Burbank, Satsuma, and Wickson, of the older varieties, and Climax of the later introduction.

THE JAPAN PLUMS.

L. Woolverton (Maplehurst Fruit Farm).

Although only introduced into America some thirty years, these plums have become very widely disseminated, receiving probably a larger place in our orchards than their real merit deserves.

Many varieties of them have been introduced and pushed upon the attention of the unsuspecting fruit grower, who has too often found them a sad disappointment. The Wickson, for example, has been much boomed, and truly is a large, fine variety; but alas! so far in our orchard, and we have planted about 100 trees, it has proved itself most unproductive.

Some of us were discussing the Japan plums at the Industrial, where Mr. John Mitchell, of Clarksburg, Ont., showed a fine collection, and the general agreement was that the following four varieties were the choice of all the Japans to cover the season, viz., Red June, Abundance, Burbank, and Chabot.

Mr. S. D. Willard, of Geneva, New York, speaking before the Western New York Fruit Growers, said of these Japans, that owing to their early blossoming his crop of Abundance was nearly ruined by spring frosts, when, hearing of the Burbank, he had them all top-worked to the latter variety. "I like," he said, "the Abundance to eat out of hand, but I do not think it as good a handler and shipper as the Burbank and some of the others. We have a good many Burbanks. Some seasons we have had four or five thousand baskets. A few years ago, when looking up something better, if we could, we ran on to the Red June, and in conference with a man from Lake Michigan. I learned that side by side with the Burbank, when the spring frost had done injury to the Burbank, the Red Jane would come out in good shape. Following up the idea in connection with the fact that it is the earliest of all plums to ripen that I know of, we have planted and fruited them quite largely. We have had them ripe and in good shipping condition on the 21st of July. I made up my mind that it was a good plum for the orchard man, and we have found it so. We had something over a thousand baskets of them last year (1901), and they brought a higher price per basket than any other plums we shipped, except some of the old varieties that came on the market after the other varieties were out of the way."

Red June.

Red June: We have received the following replies to inquiries regarding the behavior of the Red June in various sections of Ontario:

T. H. Race, Mitchell: The only varieties among the Japan plums that I have tried on my grounds here are the Prunus Simoni, Wickson, Abundance, and Burbank. The first two I have discarded; the third I have planted in where I threw all my Lombards out, and I value it very highly. The Burbank is my second favorite, though in some respects it is a better plum than the Abundance. Like the Abundance tree, the Burbank must be cut back very severely in order to get a good, shapely tree. This is especially important with the Burbank, as the yearly growth is very great, and the tree is of a sprawling nature. It should be cut back to one foot every year if a good, solid top is to be secured. It will take more years to get a good tree. but it will last all the more years, and bears its fruit better after it his been secured. On the properly pruned tree the Burbank is a beautiful plum.

A. E. Sherrington, Walkerton: In my opinion the Red June is going to be one of the most valuable plums for either home uses or market, chiefly owing to its earliness. It is a good keeper, and consequently an excellent shipper.

M. Pettit, Winona: I have fruited the Red June plum for years. The trees grow well, and bear regular crops from the third year of planting. In quality it is not quite as good as Lombard, which it resembles somewhat in appearance, though a little smaller in size. It ripens about the first of August, and being the first plum to ripen, it is valuable for market, brining about double the price of ordinary plums. As soon, however, as this plum is planted in large quantities, it is a question if it will bring any higher price than the other varieties.

It should be valuable for the family garden, because it extends the season for using fresh plums.

W. W. Hilborn, Leamington: I have been very favorably inpressed with this variety. The tree is rather more spreading in habit than the Abundance, and seems to be quite productive. The fruit is roundish conical, with a distinct point, and rather above medium size. The color is quite dark when fully ripe; the quality is good. It ripens just before Abundance, and on this account it promises to be valuable for market. I have not tested it long enough to know if it has any special weakness.

R. L. Huggard, Whitby: I consider the Red June a profitable early plum. Its color will always attract buyers. The fruit is especially valuable for canning, as the flesh remain firm in cooking and retains the flavor.

G. C. Caston, Craighurst: I reply to your enquiry about the Red June plum. I think very highly of it. It began to bear the second year after planting, and, with the exception of this year, bore regularly. It comes early. I have only one that comes in ahead of it (the Early Botan), and it bears a heavy crop. I always include the Red June when recommending a list of plums for this section. The quality is, I think, very good. It is large in size, and quite handsome. I have no hesitation in recommending it for this section.

Charles Young, Richards' Landing: My Red June plum tree bore a few fruits last year, and if I were planting out a plum orchard I would not hesitate to include the Red June. The trees here (St. Joseph's Island) have proved perfectly hardy. I measured some of last year's growth to-day (December 23rd), and it was five feet in length. The trees promise fruit next year.

J. G. Mitchell, Clarksburg: I can unhesitatingly endorse the Red June as one of the most desirable of the Japan plums, not so much for its quality, which is only fair as compared with the best Europeans, but for the season in which it ripens. It is the earliest good plum we have. The tree is a strong grower, forming a beautiful symmetrical top, and begins to bear the third or fourth year. The fruit is medium to large; color a bright vermillion red, not ripening all at once, but covering about two weeks; season, with us, last of July to middle of August; hardy.

It is only about twenty years since the Japan plums began to be propagated in America for commercial purposes, and it is wonderful how quick they have become distributed throughout the United States and Canada, while still almost unknown in Europe. Perhaps this is because the European varieties succeed so well there that the Japan varieties are not sought after in that country, while here the former class are subject to many drawbacks, such as black knot, plum rot, etc., from which the Japan varieties are apparently more or less exempt.

Chabot.

The Chabot first fruited at Maplehurst in 1902, and at once attracted our attention as being exceptionally beautiful in appearance and delicious for eating. It was imported from Japan by Mr. Chabot, of Berkely, California, and afterwards sold to Mr. Burbank, who introduced it to the trade in the year 1886. It has borne several names, as, for example, Yellow Japan, Bailey, etc., but in justice to the importer, it is now generally known as the Chabot. A good many are puzzled over the pronunciation, so we may as well state that the accent is upon the last syllable; phonetically written it is "Shabbot."

This plum has been tested at our Georgian Bay station by Mr. John Mitchell, of Clarksburg, and described as follows:

"A very strong grower, of a large, beautiful and stately top; bears the third year; fruit about the same size and shape as the Red June, but not quite so conical; skin amber, and nearly covered with red spots and markings; very attractive; season, late in September; very hardy."

At Maplehurst our record of its season is the first half of September, but perhaps it would be ten days later at Clarksburg. It did not bear the third year after planting with us, indeed, it was about the fifth year before we had any samples. No doubt early bearing depends a good deal upon the soil; and our deep, rich sandy loam encourages the production of too much wood and too little fruit. In respect to size also, it was larger with us than Red June, indeed, almost equal to Washington; but with us the crop was light, while with Mr. Mitchell probably it was heavy.

Every one who has fruited it gives the Chabot credit for being the best Japan of its season, which is about two weeks later than Burbank. The flesh is yellow, and the flavor very pleasant, though inclined to cling to the stone.

Green Gage.

The Green Gage is a good representative of a very important group of domestic plums, which is both very ancient and very desirable. Other well-known varieties of the Green Gage group are Reine Claude, Imperial Gage, McLaughlin, Jefferson, Washington, General Hand, Peter's Gage, Golden Gage, etc.

In Ontario the most popular variety of the Green Gage group or plums, especially for cooking purposes, is the Reine Claude de Bavay, commonly known among us as Reine Claude, but in the catalogue of the American Pomological Society caled Bavay. The fruit of this plum is larger than that of the Green Gage ; the tree is a stronger grower, and hence, perhaps, better suited to the commercial orchard, but in quality no one of the group excels the old typical kind, the Green Gage.

Dr Robert Hogg, author of the "Fruit Manual" of Great Britain, gives the following history of the origin of this plum :

This universally known and highly esteemed fruit has been longer in this country (England) than has been generally supposed. It is said to have been introduced at the beginning of the last century by Sir Thomas Gage, of Hengrave Hall, near Bury St. Edmunds, who procured it from his brother, the Rev. John Gage, a Roman Catholic priest, then resident in Paris. In course of time it became known as the Green Gage plum. In France, although it has many names, that by which it is best known is Grosse Reine Claude, to distinguish it from a smaller and much inferior plum called Reine Claude Petite. The Green Gage is supposed to be a native of Greece, and to have been introduced at an early period from Italy, where it is called Verdochia. From Italy it has passed into France, during the reign of Francis I., and was named in honor of his consort, Queen Claude. Shortly afterwards it found its way into England under its original Italian name, Verdochia, from which we may infer that it was brought direct from Italy. It is mentioned by Parkinson in 1629 under the name of Verdoch, and from the way in which he speaks of it, it seems to have been not at all rare, nor even new. Even so late as the middle of the last century, after it had been reintroduced and extensively grown under the name of Green Gage, it continued to bear its original title, and to be regarded as a distinct sort from the Green Gage.

If any one is making a selection of plums for his home garden, we would advise him not to omit a tree of the Green Gage for kitchen uses ; or, if he wishes to combine both kitchen and market purposes, then let him plant the Reine Claude.

The Green Gage tree is not a rapid grower, but it is healthy and fairly productive. The fruit is smaller than Reine Claude, and must be thinned to make it reach a proper size. The skin is greenish, yellowing toward maturity ; the flesh is pale green in color, and the texture melting and juicy ; the flavor is rich, sweet, and agreeable. In season it is earlier than Reine Claude, coming in about the middle of August.

Harold Jones, Maitland (St. Lawrence District) : The Green Gage plum has not proved generally satisfactory in this section. Trees that I planted in 1897 are partly dead and have never blossomed. They suffered during the winter of 1902. I know of two trees that are protected by buildings from the north wind that have given good crops of fruit in favorable years, but, generally speaking, the Green Gage is an uncertain cropper here and not profitable.

My experience and observation teach that European plums are generally unsatisfactory in this latitude, but some plums of the native American class are of good quality and succeed well.

A. E. Sherrington, Walkerton : The Green Gage plum is hardy and productive here, but in my opinion not as valuable as the Imperial Gage.

J. G. Mitchell, Clarksburg : The market demands large and showy fruit, and the Green Gage, being rather small, has always sold at a low price here. Where the Reine Claude succeeds, which is really a large Green Gage, I think there is little use in growing the small Green Gage.

W. M. Orr, Fruitland : We do not grow the Green Gage. Although the quality of the fruit is good, I consider it too small, and the tree is a poor grower. I prefer the Imperial Gage, of which the fruit is large and of good quality, and the tree vigorous and productive

Charles Ellis, Meaford: Very few Green Gage plums are grown about here. The Reine Claude is often sold under that name, but the true Green Gage is small, not very productive, so far as I have seen it, but is very good for home use.

Charles Lowry, Queenston: The Green Gage is highly esteemed, both as to productiveness of tree and quality of fruit, but the sale is limited. Every year I think the price of plums grow less, and unless some foreign market opens for them there is little hope for plum growers.

F. G. Stewart, Homers: The Green Gage is considered the best canning plum, and we get more for it at the factories than for any other. For home use it is superseded by the Reine Claude.

A. W. Peart, Freeman (Burlington Station).

Blood No. 2: Planted in 1898; tree upright, spreading, vigorous; fruit, medium, conical, round, dark red with purple bloom, very firm; flesh red to stone; season, middle of September.

Abundance: Planted 1896; tree upright, spreading, vigorous, hardy and productive; fruit yellow, with crimson flesh, large, oblong-round; fruits young; quality fair; season middle of August.

Burbank: Planted 1896; tree very spreading, vigorous, straggling grower, but by annually cutting away lower horizontal branches may be kept in fair shape; too productive every other year; requires thinning; bears very young; fruit mdium to large, oblong-round, yellow, mantled with crimson; quality fair; season late August.

Berckmans: Planted 1898; tree spreading, medium vigor; fruit medium to large, oblong-oval, dark red; flesh very soft, juicy, of poor quality; season late July.

Normands: Planted 1898; tree spreading, vigorous, and moderately productive; fruit medium, roundish-oval, yellow flesh, fairly firm, rich, juicy, sweet and aromatic, very fine flavor.

Satsuma: Planted 1896; tree upright, spreading, stocky, vigorous and productive with age. Three trees this year gave 15 twelve-quart baskets. Fruit medium to large, conic, round, dark red, with purple bloom; flesh very firm, red to the pit; excellent for canning; season middle of September.

Blood No 4: Resembles this variety very much.

G. C. Caston (Simcoe Station).

In the spring of 1895 I planted 14 varieties of plums of the European class. These all flourished nicely for a few years, and bore a few fine crops, but there is only one variety of that fourteen that is sound and thrifty to-day, and that variety is the Staunton. Northwest of here a few miles, near the Georgian Bay, all kinds of plums flourish, and continue to bear until they are large, old trees. The climatic conditions required for successful plum culture is close proximity to large bodies of water.

Some of the Japan varieties seem to thrive here, though many of them, such as Shensi, Ogon, Satsuma, and several others, have failed. Howe's, Burbank, Abundance, and Red June, are doing fairly well.

I have tested here some forty varieties of plums, and the results may be summed up thus: Of the European class, the only one that has succeeded well is the Staunton, and of the Japans the three above mentioned are the best. A number of the American class have been tested, and those that have fruited are not worth growing.

It is not advisable for anyone living a distance inland from the great lakes to go extensively into plum culture, and, further, the failure to grow plums on a large scale is not a serious disadvantage in fruit culture, as the growing of plums is now overdone to such an extent that the market is overstocked, and the prices go so low there can be little or no profit in them."

M. Pettit (Wentworth Station).

The immense plum crop of this season has convinced the growers that too many plum orchards have been planted. Not more than two-thirds of the crop was marketed, on account of rot and low prices.

One half of the plum orchards planted have not attained full bearing age.

We have found it impossible to control the rot by spraying with Bordeaux mixture this season, on account of the showery weather during August. All varieties suffered, the very early kinds, such as Red June and Red Nagate, the least. They were gathered July 31st, and sold at 40 cents per basket. We think there would be a limited demand for plums of such inferior quality at that season.

Charles Young (Algoma Station).

Plums have done very well considering the age of the trees, but I must moderate my praise of the Japans somewhat this year. They have made any amount of wood, but given very little fruit. Perhaps I have manured too freely. The Europeans have not made so much wood, but have yielded more fruit, Lombard especially; Moore's Arctic and Reine Claude, a full crop. It is a pity the native Americana plums have such brittle tops; if the wood was only tougher they might be valuable in the north; but I have found just as good fruit and tougher wood among our Canadian natives in the woods, and with a deeper, richer color than any on the experimental grounds. Of all the varieties I have tested in plums, some fifteen, all are apparently hardy, except America, which freezes on the south side of the top every year. My trees now are all one-sided, and no amount of pruning can get them into proper shape. They have not had any fruit, and at this date we may set them down as cumberers of the ground.

A. E. Sherrington (Lake Huron Station).

There are now nearly fifty varieties planted, and all doing well, with the exception of Wickson. The crop was not large this season, with the exception of Burbank, Victoria, and Lombard. The crop was all disposed of at very good prices and very few wasted.

Abundance: Tree, vigorous and hardy; fruit large; color, reddish purple; quality, good; yield per tree, three baskets, last year two baskets; bloomed May the 9th; ripe August 10th; eight years old.

Burbank: Tree, spreading, vigorous and hardy; fruit medium to large; color, red; quality, good; yield per tree, seventeen baskets, none last year; bloomed May 9th; ripe August the 27th; eight years old.

Bradshaw: Tree, upright to spreading, hardy and vigorous; fruit, very large; color, purple; quality, good; did not fruit this year, last year two baskets.

Cole's Golden Drop: Tree, strong, vigorous and hardy; fruit, large; quality, medium to good; color, yellow to light green; yield, two baskets, last year six; bloomed May the 10th; ripe September 4th.

Duane's Purple: Tree, upright, spreading, vigorous and hardy; fruit, large; color, dark purple; quality, good; bloomed May the 10th; ripe September 20th; yield, one-quarter of a basket, last year three-quarters of a basket.

Field: Tree, an upright grower, vigorous and hardy; fruit, medium to large; color, purple; quality, good; yield, none, last year one-half basket.

Geuii: Tree, upright to spreading, vigorous and hardy; fruit, large; color, purple; quality, first rate; bloomed May 10th; ripe August 27th; yield seven baskets, last year one and three-quarters; this is a first-class plum.

Grand Duke: Tree, a strong grower, upright to spreading, hardy, and a persistent bearer; fruit, large, with a heavy bloom; quality, good; makes a first-class shipper;

yield, one basket, last year three baskets; bloomed May 10th; ripe September 25th; a very profitable variety.

Hale: Tree, upright to spreading, vigorous and hardy; fruit, large; color, yellow; quality, first-class as a dessert plum; yield, eight baskets, last year three baskets; bloomed May 8th; ripe August 24th.

Hugh's Seedling: Tree, a good grower, and hardy; fruit, medium to large; color, yellow, resembles Yellow Egg; yield, none, last year one basket.

Imperial Gage: Tree, a vigorous and compact grower, hardy; fruit, medium size; color, yellow; quality, best; bloomed May 10th; ripe August 27th; yield, three baskets, last year five and two-thirds baskets; a very fine plum.

Lombard: This variety is of long standing, and considered to be a reliable plum for commercial purposes, as well as for home use; but the tree is liable to over-bear, and in such case the fruit will be small; it requires to be thinned to give best results; tree, hardy and vigorous; fruit, medium to large; color, reddish purple; quality, good; bloomed May 10th; ripe September 1st; yield, six baskets, last year two and a half baskets.

Monarch: Tree, vigorous and hardy; an early bearer; very profitable; fruit, large; color, purple, with heavy bloom; quality, good; flesh, firm, making a splendid shipper; bloomed May 10th; ripe September 20th; yield, one basket, last year four.

Moore's Arctic: Tree, a fair grower, and hardy; an early and annual bearer; fruit, small to medium; color, dark purple, with bloom; quality, very good; bloomed May 7th; ripe August 24th; yield, seven baskets, last year six baskets; should be left on tree until fully ripe to give best results.

McLaughlin; tree, a vigorous grower; early and annual bearer; fruit, large; color, yellow, mottled with red; quality, first-class; bloomed May 10th; ripe August 26th; yield, half basket, last year two baskets.

Pond's Seedling: Tree, an upright grower; fruit, very large; color, red; quality fair; yield, none, last year one and a quarter baskets; not profitable owing to its being so subject to rot.

Purple Egg: Tree, a fine grower, and hardy; fruit, large; color, purple; quality, good; bloomed May 10th; ripe September 20th; yield one basket, last year two and a half baskets; a fine shipping variety.

Quackenbos: Tree, hardy, vigorous, upright, spreading; fruit, very large; color, purple, with bloom; quality, good when fully ripe; bloomed May 10th; ripe September 10th; yield, four baskets, last year two; a very fine plum.

Red June: Tree, a strong, vigorous grower, of the Japanese variety, hardy, an early bearer, as all this class are; fruit, large; color, dark red; quality, very good; bloomed May 8th; ripe August 10th; yield, one basket, last year only a few; four years old.

Spaulding: Tree, a strong grower, spreading, hardy; fruit, medium; color, yellow; quality, good; flavor, very sweet; bloomed May 9th; ripe August 27th; yield, six baskets, last year five baskets.

Shipper's Pride: Tree, upright, strong and vigorous grower, hardy; fruit, medium to large; color purple; quality, very good; flesh, firm, a good shipper; bloomed May 10th; ripe September 4th; yield, six baskets, last year two baskets.

Satsuma: Tree, a strong, vigorous grower, and hardy, of the Japanese class; fruit, large; quality, good for cooking; color, dark red, with colored flesh, firm, making it a good shipper; bloomed May 9th; ripe, September 15th; yield, two baskets, last year seven.

Smith's Orleans: Tree, a strong, vigorous grower, hardy; fruit, large; color, purple; quality, good; bloomed May 10th; ripe August 27th; yield, four baskets.

Saunders: Tree, rather poor grower, appears to be hardy; fruit, medium; color, yellow; quality, very good; of a pleasant flavor; needs further trial.

Victoria: Tree, a very good grower, foliage large and healthy, hardy, and an annual bearer; fruit, large; color, skin yellow, mottled with red; quality, good;

bloomed May the 9th ; ripe August 27th ; yield, six baskets ; last year two baskets : a very profitable variety.

Washington : Tree, a fine grower, hardy, but rather shy bearer ; fruit, very large ; color, a rich yellow ; quality, of the best ; bloomed May 9th ; ripe, August 27th ; yield, two baskets, last year one basket.

Wickson: Tree, a slender, upright grower, tender ; fruit, large ; color, light red ; quality, only fair ; bloomed May 8th ; ripe September 27th ; yield, only a few ; the tree was damaged by frost ; too tender.

Yellow Egg: Tree, a good, vigorous grower, hardy, and an early bearer ; fruit large to very large ; color, yellow ; quality, very good ; bloomed May 10th ; ripe September 20th ; yield, two baskets, last year three baskets ; a profitable variety.

Stanley Spillett (Gooseberry Sub-station).

Japan plums have made splendid growth of wood ; only a little fruit, of fine quality ; on light soil, with a southerly exposure, and well protected by hill to north.

Burbank, eight years set, has given three tremendous crops. This season the fruit was marketed two weeks before other varieties appeared upon the market. This meant something this season, as 50 cents per 12-qt. basket was easily obtained. Good plums sold here at 25 cents later on.

R. L. Huggard (East Central Station).

Plums were a very good average crop ; very few rotted, and no curculio visible, but prices ruled so low profits were small, and some of my neighbors did not pick their fruit, stating that it did not pay them to do so.

Of the varieties, Burbank stands first for yield, and Washington highest in price, Red June and Saunders being earliest, and Vail's Seedling (a large yellow plum) latest.

Harold Jones (St. Lawrence Station).

Generally throughout the plum growing sections of Ontario this year this fruit has been produced in abundance, and thousands of baskets allowed to go to waste, but this district had an entire failure, and consumers bought all their plums from those more favored.

European Plums.

European plums did not produce a single specimen ; Japanese all failed, with the exception of Red June, which had a few fruits ; Americans bore light crops on some varieties, but not nearly the crop of 1902.

The following summary will give some idea of the odds existing against successful plum growing in the St. Lawrence counties :

Geuii : Planted 1890 ; tree, strong, vigorous grower, healthy ; fruit buds injured more or less every year ; bore two or three specimens in 1900, four or five fruits in 1902, none this year ; the buds are injured during the midwinter months, for in early April they will drop off if touched by the finger.

Lombard : Planted 1895 ; strong, vigorous, healthy grower, but the buds are winter killed four years out of five. The history of this tree gives a few plums in 1897, a fair crop in 1900 and none since nor in intervening years, so that really there has been only one crop of fruit in eight years.

These two varieties are the only ones of the European class that have borne any fruit with me, though several varieties have developed fruit buds only to be destroyed the following winter.

Japanese Plums.

Abundance: Planted 1896; vigorous, healthy tree; gave me two plums in 1897 and one plum in 1902; buds perish during midwinter.

Burbank: Planted 1898; vigorous, healthy tree, of sprawling habit; forms thousands of buds every year, but only blossomed and set fruit once, two years after planting.

Ogon: Planted 1898; a vigorous, upright tree; gave a few fruits in 1900.

I have nine other varieties of Japanese that were planted in 1898 and 1899, but have not set fruit yet, except Red June, that gave a few specimens this year.

America (Hybrid): Planted 1901; bore a few fruits in 1902, but was injured in the wood and partly died the following winter.

Gold (Hybrid): Planted 1898, gave five fruits in 1900, none since, and one tree injured and dying.

A full report of the American plums is given on page 59 of 1902 report, and I have very little more to add except that Weaver gave a full crop of fruit this year of only fair quality, not equal to Hammer or Whitaker.

These plums are of very little value to the grower when placed on the market in competition with Europeans, for buyers and commission men will tell you that they have no use for wild plums. However, such varieties as Whitaker, Hammer, Forest Rose, Stoddard, Hawkeye, etc., are varieties that are valuable here for people to grow for their own use.

RASPBERRIES.

A. E. Sherrington (Lake Huron Station).

The raspberry crop this season was all one could desire, although they were somewhat damaged in the spring by late frost; but the warm, showery weather later brought the plants on in fine shape; the yield and quality of fruit was excellent, especially such varieties as Cuthbert, Phoenix, Miller, and Louden; but Louden cannot compare with Cuthbert for yield. The red raspberries are cultivated on the hedge row system. The rows are six feet apart, and allowed to spread to thirty inches; pruning is done by removing the old canes, either in the spring or fall, and the ends of fruiting canes removed early in the spring. Blackcaps are planted in rows six feet apart, and three feet apart in the row; the young canes are pinched back when about twenty or twenty-four inches high; by this method they throw out their side branches nearer the ground, making a much stronger plant; early in the spring these side branches are shortened to about twenty or twenty-four inches. Clean cultivation is practiced; that is, they are kept clean by frequent and shallow cultivation; this also retains the moisture which is very important in the growing of raspberries. There are a few varieties which it is almost impossible to make cane enough to produce any fruit, let alone a profitable crop.

Brandywine: A rather poor grower; canes small and weak, not vigorous enough; fruit, small and soft; flavor, very good; color red, ripe July 1st; last picking, July 17th; yield, 97 oz.; not profitable.

Cuthbert: A strong, vigorous grower, fairly hardy and healthy; fruit, large, firm; color, red; quality, the best; ripe July 4th; last picking, August 8th; yield, 264 oz.; the best red berry grown.

Columbia: Plant, strong, vigorous and healthy, rather tender; fruit, large, firm; fair quality; color purple; ripe, July 13th; last picking, August 1st; yield, 193 oz.; not profitable on account of color.

Golden Queen. Plant, strong, vigorous and hardy; fruit, large; quality, good; color, yellow; ripe, July 9th; last picking August 5th; yield, 79 oz.; the best light colored variety.

Hilborn: Plant, hardy, vigorous and healthy; fruit, medium to large, firm; quality, good; color, black; ripe July 15th; last picking, 28th; yield, 56 oz., two plants.

Kansas: Fairly vigorous, but not as hardy as it ought to be; fruit, large, firm, with good quality; color, black; ripe July 9th; last picking, the 19th; yield, 155 oz.

Marlboro: Canes, strong, but of a dwarfish nature, lacks vigor; fruit, large, firm, of fair qua'ity; color, bright red; ripe July 4th; last picking the 24th; yield, 127 oz.; a good shipper.

Miller: Plant, fairly vigorous and hardy; fruit, medium to large; color, bright red, firm; quality, very good; ripe July 1st, last picking August 1st; yield 200 oz.

Ohio: Plant rather tender and weak; fruit medium to large; color black; quality, good; ripe July 13th; last picking 20th; yield, 26 oz., one plant.

Older: Canes of a trailing nature, but can be kept well together if properly cut back; fruit, large, very black; quality, good; ripe July 9th, last picking 28th; yield, 280 oz.; a promising variety.

Phoenix: Plant, fairly vigorous; perfectly hardy; fruit, large; color, red; quality, first rate; ripe July 1st; last picking August 5th; yield, 380 oz.; a very profitable variety.

Pioneer: Plant, fairly vigorous, half hardy; fruit medium; color, black; quality, very good; ripe July 13th; last picking the 20th; yield, 35 oz.; not profitable.

Reliance: Plant, fairly vigorous, healthy and hardy; fruit, medium to large; quality, very good, too soft for shipping, but a good local berry; ripe July 1st; last picking the 28th; yield, 70 oz.; a good table berry.

Smith's Giant: Plant, strong and vigorous, slightly tender, but healthy; fruit, very large; quality, good; color, black; ripe July 17th; last picking August 2nd; yield, 30 oz., two plants.

Strawberry Raspberry. This strange plant is a great success here; a plot of four feet by twenty yielded 50 boxes of fruit; the plant grows about 18 inches high, dying down in the fall; the fruit is produced on the present year's growth; fruit, large; color, bright red; quality poor; of no value.

Thompson: Plant, hardy, but not vigorous enough, canes small; fruit, small and soft; color, red, quality, fair; ripe, July 1st; last picking August 1st; yield 135 oz.

Turner: Plant, not as vigorous as some varieties, but makes a good, strong cane, very hardy; fruit, medium; color dark red; quality, good; first-class table berry; ripe July 4th; last picking August 5th; yield, 79 oz.

Taylor: Plant, fairly vigorous, not hardy; fruit, medium; color, black; quality, very good; ripe July 9th; last picking the 20th; yield, 49 oz.

John G. Mitchell (Georgian Bay Station).

Among the red raspberries the Cuthbert still holds first place for profit, and is in every way the most desirable; but all varieties succeed very well; there is no winter killing, as the deep snow affords them ample protection. Among the blacks we give Hilborn and Gregg the preference over anything we have tried.

G. C. Caston (Simcoe Station).

The Cuthbert is still the best variety of raspberry here. Its chief fault is the winter killing of the tips, so that much of what should be the bearing wood is lost. I am looking for a berry as good as the Cuthbert, that has not this fault; that will not kill back in winter, and will produce a berry of as good quality as the Cuthbert.

STRAWBERRIES.

E. B. Stevenson, Arkwright, Ont.

The season of 1903 could hardly be called a normal one. On this account it was not a very easy thing to tell which variety could be truly called the earliest. The claim has not been made good as yet by any of those aspiring to it, and the past season did not help in coming to a decision. The spring came in somewhat earlier than usual; we had some very warm days in March, which started some of the varieties into growth, so that there were seen a few scattered blossoms before the month ended, which was a very unusual thing. The last of April or first of May usually arrives before we see strawberries in bloom. The month of April, on the whole, was cold, in which we had several hard frosts, viz., a very hard frost on 20th, which blackened all blossoms open at that time; Michel's and Palmer's Early were cut by this frost. Then for five or six days we had fine weather, when Palmer, Michel, Van Deman, Clyde, Excelsior, Johnson, started to bloom; the days were fine, but the nights cool, with wind in the north and west. On April 30th, had another very hard frost; many blossoms killed that were open. May opened with a freeze-up that destroyed all the blossom left by the last frost, and some buds that were not open. So hard was the frost on May the first that ice half an inch thick formed on pail of water standing outside the door.

On May 2nd and 3rd fine, with shower; plants beginning to show bloom again. The severe frosts up to and including that of May 1st seriously hurt the crop of early varieties, very much diminishing it, and causing most of the kinds to ripen together, or with very little difference as to time. Thus it was impossible to compare the varieties as to the earliness of fruiting.

On May 9th Palmer, Elba, appeared to be in full bloom; also Johnson, was well out in bloom, as also Bederwood, August Luther, Smith's Seedling, Lord Sheffield, Stone, Hero, Earliest, Michel, Excelsior, and Van Deman; others were beginning to show up well, such as Sen. Dunlap, Superior, Thompson's No. 202, Thompson's 500, Downing's Bride, Success, and Nichol's No. 6; Family Favorite, Sampson, and Great Ruby, Dewey and Tennessee, Prolific, Ruby, Hawaii, Maxwell, Enhance, J. Ruskin, Maximus, Monitor, and Woolverton; Wm. Belt, Clyde, and Bubach No. 3,298, Crescent, Miller, Haverland, Anna Kennedy, Leader, Lyon, and Nick Ohmer. It will be seen from the above that some of those that in an ordinary and normal year bloom only after the early ones are over blooming, and their fruit well set, this year were in bloom at the same time with some of the usually early varieties.

May 13th, have had about a week of fine warm weather, and might say most of the varieties are in full bloom. Some of those that were hurt most by the late frosts of April and early May are showing up well, as Palmer, Johnson, Van Deman, August Luther, Michel, Elba, Lyon, but in need of rain.

May 18th, fine thunder shower freshened up things. Most varieties of medium season in full bloom, such late varieties as Gandy, Huron, Nettie, Aroma, Timbrell No. 18, just opening.

May 27th and 28: Thunder storms and heavy rain, which soaked the ground, and was greatly needed.

May 29th: Van Deman, Michel and Texas showed the first ripe berries, with Early Beauty and Fairfield coloring; these last two were on potted plants set out last September.

Mry 30th: Lyon showing red, resembled the old Longfield of Dr. Stayman; the past few nights have been cool, almost frost at Jordan.

June 1st: Getting warmer; Fairfield ripe; the berry is a godd size, roundish, conical. dark scarlet; plant strong; Dewey coloring; first ones on Johnson, Palmer Early; the prospects appear fine for a good crop.

June 12th: The early varieties coming to an end, as Michel, August Luther. The season lasted about four weeks, June, on the whole, was cool and moist, and thus was produced perhaps one of the largest crops of strawberries ever gathered here in Ontario. Certainly the early appearances did not promise such an immense yield.

This season has again emphasied the superiority of the narrow row system, with soil well prepared. The strawberry may be grown on any land that will produce a good crop of potatoes, turnips or corn; ground that has been well manured for roots is perhaps the best for the strawberry. They should not be planted on newly-plowed sod land, nor on ground on which the water stands after a rain, or through the winter. On the newly-plowed sod you will often find a good crop of the white grub, which will make havoc amongst your newly-set strawberry plants. I have seen the white grub clean off the plants from a two-acre field that had been planted on sod land. I believe there is no single need in fruit growing of such great importance as the careful and thorough preparation of the soil for the successful growing of the strawberry, and I believe no fruit is more unsatisfactory and unprofitable when neglected or only half cared for, and no fruit that will respond more readily than the strawberry to the proper treatment, and only those who are well acquainted with what that fruit is capable of could be made to believe that the strawberry can produce when given all the proper conditions for its best effort. The question naturally arises, What is the strawberry capable of under favorable conditions? I reply without fear of contradiction, that the grower who gives it these conditions, who does so from a knowledge of its needs, will, one year with another, clear from two hundred and twenty-five to two hundred and seventy-five dollars, after all expenses are paid, from each acre of strawberries.

The past season we may call a fairly long one, from May 28th, when Van Deman, Texas, Michel, and Early Beauty were ripe, up to July 1st, when Aroma, Nettie, Hunn and other late varieties closed the season.

On account of the hard frost we had May 1st, we did not expect any ripe berries so early.

With the above thoughts on the general conditions of the season of 1903, we may now tell how different varieties acted after the very severe ordeal they had come through. Among the new varieties of promise I may mention the Lyon, Palmer, Texas, Mrs. Fisher, Howard, Ham, and Success. Among the old varieties none did better than the Tennessee Prolific, Haverland, Clyde, Saunders; among the newer kinds Monitor again did very well; also Parson's Beauty, Joe, Buster, Irene; Splendid, an old variety, did very well.

The following new kinds have been secured for our trial plot, to fruit next year, viz.: Beaver, Climax, Cameron's Early, Commander, Early Beauty, Ernie, Fairfield, Gen. De Wett, Gersonda, Howard's No. 3, Howard's No. 7, Howard's No. 103, Jaggers, Magoon, Lucas, Oom Paul, Pocomoke, Paxton, Twentieth Century, Tilghman's Favorite, President Warren; all these have made a good growth of plant, so will be able to report on them after fruiting in 1904. I have the promise of several other new kinds, one of which is claimed to be the long-sought-for "Perfect Strawberry." It is claimed for it that it has not one weak point.

Description of varieties grown in 1903. Trial plot of Strawberry Station:

Aroma (perfect blossom): This is one of the latest; strong, healthy plant; berry, large; its lateness insures against frost; growing in favor for very late.

Auto (perfect): Originated in Delaware, and sent out by Slaymaker & Son: the plant is a good one; fair grower; the berry is large, somewhat ribbed, like Glen Mary, and fairly productive; should like to give it another year's trial before deciding as to its merits.

Armstrong (perfect): Sent to me by James Vick & Sons, Rochester; a strong grower; plant large and strong, vigorous and healthy; berry, large, somewhat irregular; red seeds imbedded in flesh; flesh white and medium in firmness, and good flavor; fairly productive; medium in season; large and fine.

Annie Laurie (perfect) : Might be taken as a standard as to quality ; plant, good grower, strong and healthy ; a shy bearer ; berry, bright scarlet, and very best quality ; not productive enough for commercial grower.

August Luther (perfect) : A good early variety ; plant, small, but good grower, and healthy ; I have not seen any rust on it as yet ; produced good crop of good berries, of nice color, scarlet, and firm, with yellow seeds ; sometimes the berry has a neck ; medium in firmness ; not quite as early as Michel this year ; was not hurt as much as Michel by the frost ; does better over a wider area than Michel.

Bubach No. 5 (imperfect) : This old standard variety did well this year ; no finer berry for size and color than Bubach ; seems to be weakening in plant ; very productive and profitable for near market.

Blonde (perfect) : Did well again this year ; plant good runner ; leaves curl up like Greenville ; makes good row berry ; bright scarlet ; medium in size ; yellow seeds ; prominent, somewhat like Nick Ohmer ; medium to soft ; flesh, pink, and good flavor, and quite productive.

Bismarck (perfect) : A seedling of Bubach ; a good, strong plant, and healthy ; berry. round and large, bright light scarlet, with yellow seeds; in wet seasons quite light colored ; quite productive ; a good one.

Brandywine (perfect): Did very well the past season; a very vigorous grower and healthy plant; berries, large to medium, dark color, firm, and quite productive ; very large calyx to the berry ; a very desirable variety.

Beder Wood (perfect) : This very valuable early variety was hurt by the late frosts, and so did not do as well as usual; it is one of the best early varieties ; none more productive ; might be taken as standard for productiveness for early varieties.

Bush Cluster : I had two varieties sent me with this name, quite different from each other. The first variety was a good grower, healthy ; berry, bright scarlet, yellow seeds, flesh white, firm and good quality, and quite productive. The second was late, and not as valuable as No. 1; will give further trial ; it is evident one of these was sent out with a false name. The true bush cluster was originated, I am told, by L. Hubach, of Arkansas.

Benjamine (perfect) : Rather a weak plant ; late ; berry, large and somewhat irregular but firm and good quality ; the plant is quite productive; one season's trial; will give further trial.

Bennett (imperfect) : Good plant-maker, and healthy, and quite productive ; berry, conical, dark scarlet, yellow and red seeds, imbedded ; flesh, red, medium in firmness, and fair quality ; a good keeper.

Carmi Beauty (imperfect): Plant good grower ; healthy and productive ; berry, medium in size and irregular, somewhat round, and does not ripen early ; good flavor.

Clyde (perfect) : Did very well this year ; while some object to its color, it is a great favorite in most places, many growers placing it first as a market berry ; it is very large and very productive ; when given good treatment, one of most profitable.

Challenge (perfect) : Did not do as well as last season ; the plant seemed to be hurt very much by the winter ; came out in the spring very weak, and did not make as vigorous growth as it gave promise of after the very excellent showing it made last year ; it was very disappointing this year ; will give it further trial.

Corsican (perfect) : Plant large and strong, very healthy; fairly productive; berry, large and good quality. It is in the same class with New York, Uncle Jim, Armstrong ; it is somewhat like Woolverton ; this is the berry sent out by Green of Rochester.

Cobden Queen (perfect) : Plant strong, healthy grower, light in color ; quite productive ; leaves curl up somewhat ; berry scarlet, with yellow and red seeds, roundish in shape, flesh pink, medium in firmness and good quality ; did well the past season.

Carrie (imperfect) : Plant, healthy, good grower ; makes a good row ; not productive enough. The plant is like the Haverland ; the berry is like Haverland in shape.

not so long, but larger, good dark scarlet; medium in firmness; not so good as Haverland, its parent.

Charlie (perfect): A new one sent out by N. Barton of N. J.; plant is large, healthy; is not a great runner; makes plants sparingly; berry is large, bright, glossy scarlet; very uniform in shape, conical, quite firm; good quality and quite productive; is quite promising.

Downing's Bride, or Kitty Rice (imperfect): This variety does not do as well as in Ohio, its native place, while Mr. Crawford says it was, all things considered, the best variety he had the past season. I could not say that of it here. A good grower, the plant is somewhat tender, yet making plants freely; the berry is roundish, conical, pale in color, with yellow seeds, flesh pink, fair quality; the plant is quite productive.

Dewey (perfect): Seedling of Haverland and Parker Early; a good plant; quite productive; berry, large to medium; light red in color, red seeds; shape like Haverland: flesh pink, firm, and good quality; first fruiting; further trial.

Drought King (perfect): Good plant; berry, red, with bright green hull, flesh pink, medium in firmness; good quality; large and fairly productive; first fruiting; further trial.

Earliest (perfect): Almost identical with Michel. I can see no difference between them after another season's trial, growing side by side.

Excelsior (perfect): Good plant-maker; some rust in places; on some soils this is a good early variety; did not do so well with me as some of the other earliest, viz., Van Deman, Johnson's and Michel.

Echo (perfect): Sent me by Jas. Vicks & Sons; good plant; good grower; dark foliage; plant healthy; berry, large, scarlet, yellow seeds; flesh, white, firm and good quality; fine flavor; quite productive; berries shaped like Monitor; very promising.

Eleven-fifty-nine p.m., or Midnight (perfect): Plant healthy; good grower; only fair in productiveness; short fruit stems; bright pale pink flesh, firm and meaty; it is late, but not very desirable as a market sort.

Emperor and Empress (both perfect): Both did well with me the past season; if there is any difference it is that the Empress has most berries, and are larger; quite productive; two sorts worthy of a trial.

Epicure (perfect): Sent to me by Peter Henderson Co., of New York; the plant resembles the Gandy; berry very large; medium in firmness; scarlet, hollow, fair flavor; only fairly productive; first season's fruiting; further trial; may turn out to be Gandy.

Family Favorite (perfect): From P. Henderson & Co., of New York; good plant; very productive; medium-sized berries; good scarlet; yellow seeds; flesh white, firm; acid flavor; first fruiting; further trial.

Granville (perfect): Seedling of Miner's Prolific, sent by A. M. Nichol, of Ohio; plant, strong and good runner; healthy; berry, dark scarlet; roundish, conical, very large, flesh red; good quality; medium in productiveness; late season; first fruiting; another trial.

Glen Mary (perfect): Did very well this season; a profitable variety; plant strong, healthy and good grower, and quite productive; berry, very large, good color, somewhat irregular, with green tip; fair in quality; quite firm; a good shipper.

Greenville (imperfect): Resembles its parent, the Bubach; not so large; plant a good grower; leaves curl up some; quite productive.; good color; a profitable variety for market.

Great Ruby (imperfect): Sent me by P. Henderson & Co., of New York; plant good grower, healthy; makes plants freely; berry, dark crimson, yellow seeds; flesh, red, firm, fair in quality; medium in productiveness; first fruiting; another trial.

Gandy (perfect): Some very large, fine berries, very late; a shy bearer; one of the best very late varieties.

Haverland (imperfect): One of the old standards; hard to beat: one of the very best for market growers; does well everywhere it is grown; Clyde is a good one to fertilize it, as they bloom together; very productive; of large, long, bright, light scarlet berries, that look well in the basket.

Howard's No. 4 (imperfect): A seedling sent me by Mr. Howard of Massachusetts. It did very well with me this year; the plant is a good, healthy grower; makes plants freely, and quite productive; the berry is large, conical, very regular and uniform in shape; it is late in season; not yet introduced; it is very promising.

Hawaii (perfect): Seedling of Haverland and Parker Earl; good plant-maker, healthy and productive; berry, scarlet color, conical, yellow seeds, flesh pink, ; medium in firmness; good quality; first fruiting; further trial.

Hero (perfect): Plant a vigorous grower, healthy; rich dark green foliage; berry, large, scarlet, with yellow seeds, medium in firmness; fair quality; quite productive; did well again this year; second fruiting.

Honest Charlie (perfect): Sent out by J. L. Farmer, of New York; plant, large and healthy; stools out; good one for hill system; quite productive; medium in size; will do best in hills.

Hunn (imperfect): A very late variety; did well for it this season; rusts very much sometimes; berry is large, quite dark in color, with dark red seeds; roundish, firm, and good quality; counted one of the good extra late varieties.

Joe (perfect): Sent me by J. H. Black, of New York. Did well again this season; a good late sort; plant good grower, large and healthy, free from rust; strong fruit stalks; quite productive; ripens with Gandy and Hunn; I consider it a good late variety

Jersey Queen (imperfect): Another late sort that did well the past season; plant is small, lies flat on the ground, a free runner; fairly productive for so late a kind; the berry is large, roundish, like Bismarck; light scarlet, yellow seeds, and fine flavor.

Johnson's Early (perfect): A good early variety; did well this year; the plant is medium in size, dark green in color, healthy, and a fair plant-maker and productive; the berry is larger than Michel; in color and shape resembles the old Wilson; very favorable reports of it come wherever it is grown; well worth a trial.

Irene (imperfect): A good plant-maker; strong and vigorous, and healthy, and quite productive; the berry is medium in size, scarlet in color, fairly firm, good acid flavor; late in season; will prove a good late variety; worth trying.

Ideal (perfect): Plant, a good one; healthy and good runner, and productive; berry, very regular and uniform in shape; conical, firm, bright scarlet; fair quality; fine looking.

Klondike (perfect): Plant, small but good grower; rusts some, but quite productive; the berry is large, softish and somewhat irregular; did well this season; not firm enough to ship far; quite late.

Lovett (perfect): Did well this year; plant, good grower, and productive; berry resembles the Williams and Saunders; a good sort; some growers prefer it to either Williams or Saunders.

Lord Sheffield (perfect): A good early kind, from England; makes plants freely; some rust; quite productive; the berry is round, dark red. quite large, and good quality; a good early.

Lady Garrison (perfect): Good plant, productive; berry, roundish, conical, red, with red seeds imbedded; flesh pink; medium in firmness; good quality; somewhat like Monitor in shape; one fruiting; will give another trial.

Lester Lovett (perfect): Sent out by J. T. Lovett, of New York. I have fruited it. and I should say it was none other than the old Gandy; I could see no difference between the two, as they grew in the same plot; same plant, same berry, same time of fruiting.

Lyon (imperfect): One of the most valuable of the new ones I have had on trial; very productive; good plant-maker; runners freely; the berry is long, conical; resembles very much the Longfield, sent me some years ago by the late Dr. Stayman, of Kansas;

a bright red, flesh red, firm, flavor spicy and good ; its productiveness will make it a favorite with market growers.

Luxury (perfect) : Plant weak ; did not come through the winter well ; the berry, dark red, yellow seeds, deeply imbedded, flesh red, firm, and good quality ; medium to productiveness ; will give further trial.

Marie (imperfect) : Good plant-maker, and productive; the berry is medium to large, round, and red clear through, with yellow seeds ; medium in firmness ; somewhat sour, but spicy ; did well again this year ; quite promising.

Margaret (perfect): A grand berry if given proper conditions; plant, large, strong, and healthy, and productive ; berry large and fine-looking ; one of the best, with good cultivation.

Miller (perfect) : Did not do well ; I think it may have been hurt by the late frosts ; it was very disappointing ; very few berries, and not very large ; will give it further trial

Michel (perfect) : As a very early it was not a success ; the frosts killed all the early blossoms, so that what fruit it produced came in competition with larger and finer medium sorts ; the Michel was not in it this year with them.

Monitor (perfect) : Was again a success, for second year's fruiting ; the Monitor is a valuable early medium sort ; a seedling of Crescent and Captain Jack ; the plant is small, but a vigorous grower ; dark green in color, and quite productive ; the berry is roundish, large, glossy scarlet, fine looking ; it is one of the best of the late introductions ; well worth a trial by all growers.

Mark Hannah (imperfect) : Seedling of Bubach, by M. T. Thompson, of Virginia ; plant healthy, and a good grower ; berry large, scarlet, with yellow seeds ; flesh, pink, medium firmness ; fair quality ; quite productive ; one fruiting ; further trial.

Mrs. Mark Hanna (perfect) : Seedling sent by M. T. Thompson ; good plant ; medium in productiveness ; berry large, scarlet, yellow seeds, flesh light pink ; solid ; good quality ; further trial.

Morgan's Favorite (perfect) : Good strong plant ; dark foliage ; like Woolverton ; berry, large ; scarlet seeds ; flesh, white and pink ; good quality ; quite productive ; this is, no doubt, the Woolverton, sent out as Morgan's Favorite.

Minute Man (imperfect) : Good plant ; berry, bright red, roundish, conical, yellow seeds ; flesh, white and pink ; medium in firmness, and good quality ; the berries are quite regular ; will give further trial.

Mammoth (perfect): Strong, healthy plant ; berry dark scarlet and good size ; red seeds, flesh pink ; medium in firmness ; good quality ; one fruiting ; further trial.

New York (perfect) : Did well this year, in same class with Woolverton, Corsican, etc.; good plant, healthy and strong; berry, flesh white and pink ; hull dries up ; medium in firmness ; good quality ; fairly productive.

Nick Ohmer (perfect): Was hurt by the frost; some fine, large berries; a good many seedy and small ; seems easily to be hurt by late frosts, even when blossom is not open at the time of the frost.

Nettie (imperfect): Plant, strong grower ; quite productive; very late, and quite irregular ; large to very large.

New Globe (imperfect) : Good plant ; medium productiveness ; berry, medium to large ; firm ; good quality ; late ; one fruiting ; further trial .

Nichol's No. 6 (perfect): Seedling sent out by A. M .Nichol, of Ohio ; not yet introduced or offered for sale ; the plant is strong and healthy ; a good grower ; quite productive ; berry, dark scarlet, yellow seeds, flesh red, firm ; good flavor ; promising ; one fruiting ; further trial.

Overholt's Special (perfect) : Seedling from H. Overholt, of Jordan, Ont.; strong, healthy plant : good runner ; productive ; roundish in shape ; dark scarlet; yellow seeds ; good flavor ; somewhat hurt by frost ; worth a trial.

Parson's Beauty (perfect): Did well the past season; good plant, makes runners freely; quite productive; berry large, dark scarlet, firm, conical in shape, of good quality; a little acid; like old Wilson; a very good market variety; very promising.

Pride of Cumberland (perfect): Rusted badly; had a few large, fine berries; did not do as well as usual; good grower; berry large, dark color, firm and productive.

Palmer's Early (perfect): This is a new one, and did very well with me from one fruiting; should say it was a good one; good plant; runs freely; berry, dark red; medium in firmness; good mild flavor; quit productive; one fruiting; further trial.

Ruby (perfect): Good plant; free runner; quite productive; berry roundish, conical, scarlet; large; flesh pink, firm and good quality; a good one.

Repeater (perfect): Good plant, healthy and good grower, and productive; berry large, conical, bright red, medium to soft, quality good; one fruiting; another trial.

Ryckman (perfect): A new one, sent me by G. E. Ryckman, of New York State; it was hurt very much by late frost; it was sent me as very early; the frost prevented that this year; the plant is a strong, healthy grower, making plants freely; there were a few very fine berries; one fruiting; wil give further trial.

Saunders (perfect): Did well this year; one of the best sorts for the market grower; very much resembles Williams in fruit and season; the plant is larger, and does not rust as much as Williams does sometimes.

Seafford or Lloyd (imperfect): Gave a good crop of fine berries; plant rusts somewhat; berry is large, dark, fine, and of good quality.

Senator Dunlap (perfect): A valuable variety; plant small, but vigorous grower, and quite productive; berry much resembles the old Wilson in shape and color; a bright dark red, red right through the berry; firm and good quality; did well the past season.

Splendid (perfect): Well named; it did splendidly this season; a first-class market variety; the plant is healthy, good, strong grower; quite productive; berry is large, round, bright scarlet, firm, and fair quality; a good pollenizer for such kinds as Bubach, Haverland, Sample, etc.

Sample (imperfect): Here is another good one; the plant is a strong, healthy grower, fine grower; quite productive; the berry is large, conical, good scarlet, firm. fine looking, and sells well; it is medium to late in season.

Shepherd (imperfect): A new one; plant good grower; makes plenty of plants; quite productive; the berry is very large; pink in color; does not color up well; fine flavor; firm for so large a berry, and quite late in season; one fruiting; will try it again.

Sutherland (imperfect): New; seedling of Burbach, by E. Sutherland, of New York; plant a good grower and productive; berry, medium to large; bright scarlet; flesh red, roundish, conical; fair quality; did well; one fruiting; further trial.

Success (perfect): Seedling from Connecticut; a good plant-maker, strong, and healthy; productive; the berry conical, bright, dark scarlet, with yellow seeds; early; berry, solid and of good quality; from one fruiting; would say it is a good one.

Superior (perfect): The plant is healthy, and good grower and quite productive; of medium to large berries; bright, dark scarlet, with red seeds; flesh white in centre, firm, and good quality, and fine flavor; one fruiting; another trial.

Sampson (perfect): Good plant; healthy and fairly productive; conical, scarlet, and with yellow seeds; flesh, white, firm and good quality; early; it was much hurt by late frost.

Tennessee Prolific (perfect): One of the best market varieties; plant, healthy and strong: vigorous grower; was amongst the best the past season; it has always done well; first season; berry, bright scarlet, large, good flavor and firm; all should grow it.

Texas (perfect): From California; new and an early variety; the plant is healthy, good strong grower; the berry is a round, bright scarlet, with yellow seeds; flesh, pink; medium in productiveness and firmness; fair quality; it does not run much; one fruiting; another trial.

REPORT

OF THE

Inspector of Fumigation Appliances

1903

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE.)

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REPORT

OF THE

Inspector of Fumigation Appliances

1903.

To the Honorable John Dryden, Minister of Agriculture :

Sir,—I beg to submit therewith the Fifth Annual Report of the Inspector of Fumigation Appliances.

A the conditions in respect to the San Jose Scale were very much the same this year as in 1902, no important changes were necessary in the carrying out of the fumigation laws. Owing to the strict enforcement of the laws in the past four years, the Scale is still confined to two districts, viz., the Niagara Peninsula and part of the Counties of Essex and Kent. If it had not been for the prompt and effective work of the Department of Agriculture in tracing and destroying all infested nursery stock in the Province, the fruit industry would have been in very bad condition to-day. The most important of the apple-growing counties including Huron, Middlesex, Northumberland, Durham and Ontario are now entirely free from the Scale, and as the raising of this fruit is becoming of such vast importance to the farmers of Ontario, every effort should be made to protect them against any further spread of he insect. Unlike many insect foes, whose presence is quickly apparent, the San Jose Scale is not noticed until it has secured a firm foothold in the orchard. Then, as the growers of the Niagara District have found, the work of extermination is not only very difficult, but also very expensive.

The work of inspection has been carried out as in former years by personal visits both in spring and fall to all nurseries in the Province, offering stock for sale. Nurseries handling only evergreens, strawberry plants, bulbs and tubers, herbaceous perennials and bedding plants are exempt from the provisions of the Act, as such plants have been found to be free from attacks of the Scale. A number of the seedsmen offer for sale small fruits such as currants, gooseberries, raspberries and also grapes. As these plants are susceptible to attacks from the Scale it is necessary that these men should observe the law in regard to fumigation of such stock. This is also the case with all firms handling ornamental shrubs and trees. Fortunately almost all of the firms handling this class of stock are outside infested areas, but as they are likely to be constantly getting stock from other sources, the danger of infestation is always present

NURSERIES.

The nurseries as a whole are in better condition now than when the inspection was started. Many of the smaller firms have given up business owing to restrictions placed upon them by the law. This is especially the case in the scale infested centres, where the additional cost of employing an inspector to superintend the fumigation so increased the cost as to the render the business unprofitable. This condition has aided considerably in the work of checking the spread of the Scale to new sections. The fewer the nurseries in the affected limits the closer the inspection can be made and the better watch can be kept over the fumigation.

At present all the nurseries requiring assistance are placed in the hands of men who take entire charge of the fumigation both in spring and fall. This is quite easily arranged with the larger nurseries, but with the smaller firms it is not only very expensive to the nurseries themselves, but also very difficult to procure a man to take charge of the work. The places are scattered and the dates when the fumigation is required vary greatly. There is practically not a day's steady work at any one time. It is to be hoped that these men who are carrying on the nursery business as a kind of side issue, will see fit, when their stock is so situated as to be constantly subjected to attacks of the Scale, to retire from business altogether. If the fruit growers would refuse to buy from these men, they would soon be compelled to do so. Cheap stock is dear at any price, especially when it is almost certain to be infested with the Scale.

In the spring the following circular letter was sent out to the nurserymen of the Province

"Toronto, February 26th, 1903.

"Dear Sir,—The spring inspection of fumigation houses will begin about the middle of March. If you are handling any nursery stock for spring sale, including apple, pear, plum, peach, cherry and quince trees, grape vines, raspberry, gooseberry, and currant bushes, and all ornamental shrubs and vines, you will kindly notify me at once so that your fumigating appliances may be inspected.

"Chemicals may be obtained by writing to this office. As in most cases, such must be shipped by freight, it is absolutely necessary that you order the required chemicals early. Owing to the impossibility of testing same, nurserymen will not be allowed to use cyanide or acid obtained locally.

"Please commence to have your house put in order at once. Make repairs where necessary, so as not to delay the Inspector. Owing to the limited time no place can be visited twice, and if your house is not in shape, the delay will probably prevent any shipment of stock this spring."

As nurseries are not required to obtain a license to carry on business, no accurate record can be obtained of those actually engaged. While many of the smaller firms have given up work, others may be starting in entirely new sections. Of these your Inspector has no trace unless he comes across the names by chance. Some sort of registration seems necessary to safeguard the interests of the fruit growers and of the nurserymen already engaged in carrying out the fumigation laws.

No opposition, as was the case in former years, has been shown to the enforcing of the laws. On the contrary, a certain feeling of apathy has developed which is worse in some instances than the opposition previously encountered. This is due largely to the fruit growers themselves who have till quite recently shown very little interest in the question.

Dr Fletcher, the Dominion Entomologist, writing from Ottawa, says: "I am very glad to see that a few people are beginning to wake up to the danger of neglecting the San Jose Scale. There is nothing new in the situation since last year. Lazy, ship-shod people will always make excuses for not doing what they know is their duty to the community at large and even to themselves. If the fruit growers instead of complaining about what the nurserymen are doing, or are not doing, would attend to their own work better and buy new stock only from the best nurserymen instead of always looking for the cheapest, wherever these nurserymen may be situated, it would be a good thing for Ontario."

"The lime and sulphur wash as described in Prof. Lochhead's recent bulletin is the remedy which has given by far the best results, and after the magnificent work done by Geo. E. Fisher for the Provincial Government no one with any pretensions to common sense or business ability can say that he does not know what to do."

CONDITIONS OF THE SCALE, METHODS OF TREATMENT, ETC.

Prof. Lochhead, who has been largely interested in the San Jose Scale since its appearance in Ontario, makes the following statement in a recent bulletin by the Department of Agriculture.

"It is now nearly ten years since the San Jose Scale made its appearance in the United States east of the Rockies, and it is about seven years since it first appeared in Ontario. It has made progress in that time in spite of all the efforts which have been put forth to keep it under control. In the St. Catharines district there are but few orchards which have escaped invasion and many have succumbed to the terrible attack. In the west the Scale is very prevalent in South Essex and Kent. Although the Scale is so widespread in these districts, yet we must remember that if it had not been for the energetic action of the Government in appointing inspectors, and in passing the Fumigation Act for the treatment of nursery stock, in my judgment, the Scale would have spread to most parts of the Province."

Mr. J. Fred Smith, the Provincial Inspector, says,—"I have had no notice, nor have I found the Scale in any new district this year, but in the old places where the Scale was first found, things are in very bad shape where no spraying has been done. I have never seen the Scale increase so rapidly as it did this year. It seems as though a great number had wintered over, for at the beginning of July there was as much young Scale as we usually find by the beginning of September.

There have been some splendid results this year from the uses of lime and sulphur, and some good results from crude oil, but in my opinion not so good as the sulphur spray. At Winona, Alex. Glover had a peach and plum orchard about six years old. The Inspector found, during the summer of 1902 some trees quite bad with Scale. During the month of September Mr. Fisher and I sprayed the worst tree with crude oil emulsion and last spring Mr. Glover sprayed the whole orchard with lime and sulphur, with the result that on the 5th of August when we examined this orchard we could not find a single live scale, but I have no doubt there must have been a few and some by this time very lively. I could name you other orchards nearly as good, the only difference being in the application, for there is no doubt that any of our remedies will kill the Scale if they are thoroughly applied. It is just a question of hitting to kill, but trees that are encrusted cannot very easily be cleaned and I always advise taking such out for the reason that the wash cannot penetrate to the lower layers. There was very little lime and sulphur used east of Jordan. At St. Catharines and Niagara the bulk of it was crude oil, and it was used on everything, with the result that quite a number of peach and plum trees were killed. However, there does not seem to be any objection raised as they seemed to feel that it was a case of kill or cure and were willing to take the risk, although they had been warned.

In regard to the conditions in the United States, Dr. L. O. Howard, Chief of the Division of Entomology, says: "In answer to your questions relative to the San Jose Scale, you are informed that this insect is slowly spreading in the United States. The excitement which its first appearance occasioned, however, is dying down, and our people are becoming familiar with the methods of controlling it, and are ceasing to fear it as at first. There has been no new method of treatment which has the endorsement of much practical experience. The lime, sulphur and salt wash is the remedy commonly employed and recommended. The difficulty of this preparation is the sole objection to it, and if one has any considerable amount of orchard to spray, the expense of a suitable plant is warranted, and this difficulty is largely obviated. The various efforts which have been made to quicken or cheapen the process have not been satisfactory, or at best have been less efficient than the standard wash prepared as dircted in our Circular 52, copy of which I enclose.

Nurseries are inspected in most of our States, certainly all of those whose fruit interests are of any great importance, and the nursery stock usually goes out with a certificate of fumigation. The introduction of the Asiatic enemy of the Scale is still in the experimental stage. It has been fairly widely distributed, especially in the southern peach-growing States, and some notable success has been had with it in Georgia. Nowhere, however, has it been sufficient enough to make one advise the discontinuance of spraying operations, except in the orchards where it has been colonized, and where it is desired, of course, that the Scale be let alone to give the beetle a chance to multiply. It is more than probable that spraying will be a necessity for many years to come, as it has been for many years past in California. In the latter State the process has become so familiar to orchardists that they think little of it, and the benefit to the trees, other than in merely keeping down the Scale is so great that the treatment is recommended whether the trees are infested with the Scale or not. In the East, for example, this wash has been most efficient in preventing peach curl, and important growers here say that their sprayed trees bear more fruit than those unsprayed, and are kept in fine, clean condition, so that in the East also spraying with this lime, sulphur and salt wash is very beneficial in preventing fungous diseases."

From this letter, it seems that we cannot expect any help at present from the use of insect and fungous enemies of the scale. Prof. Gossard, of Florida, also writes, "Only one attempt has been made to introduce Chinese lady bugs, and the colony commenced breeding this year, but at the last time my visit was made to the orchard in which the insects were loosed, I could find none of them, and I shall be obliged to make another visit to the orchard before I can tell definitely whether the colony succeeded or failed."

"The chief fungous disease of the Scale is native to this State, and usually springs up spontaneously after the Scale has been bad, if the trees have been able to live through an attack of two or three years. Young orchards less than two or three years old, are almost certain to be killed by the insects unless treated by some insecticide."

Experimenters hoped that by the use of soda or potash, the preparation of the lime-sulphur mixture might be greatly simplified. It was thought possible to considerably reduce the time required to boil the sulphur, and perhaps to do away with the boiling altogether. Of course this would reduce the cost of preparing the wash and do away with any expensive apparatus. Experiments at the Ohio Station apparently showed that to all appearances the soda wash accomplished very little good. The treatment did not prevent the fruit from being rendered unsalable because of the spoiling by the Scale nor did it check further injuries to small twigs and branches. Further experiments are now being carried on along this line by the Department of Agriculture and better results are hoped for.

The use of this lime-sulphur mixture is strongly recommended in all small nurseries where the scale exists in any considerable quantity in the immediate neighborhood. Very young stock which will not be sold for two or perhaps more years, and therefore will not be subject to fumigation till that time, should be especially taken care of, and should preferably be treated with this wash. On account of the small size of the stock they can be very easily got at with the spray-pump.

CHANGE OF FORMULA.

A slight change was made last year in the formula used in the fumigation. As some of the smaller nurseries still buy the chemicals in bulk, the New Jersey formula with its fractions was found to be rather complicated, and the simpler formula, 1:1:3, adopted by the Dominion Government, was substituted. As tests had shown that no injury resulted from the use of this amount of cyanide and acid on peaches, Japan plums and cherries, the formula for the fumigation of this class of stock was done away with. These changes have simplified the work required for fumigation without in any way lessening its efficiency. The following circular of instruction was sent to every nurseryman in the Province :

MEMO. FOR THE GUIDANCE OF NURSERYMEN IN THE FUMIGATION OF NURSERY STOCK.

READ CAREFULLY AND PRESERVE.

1. Formula to be used for all classes of Nursery Stock; per 100 cubic feet in house or box:

Cyanide—One ounce.
Sulphuric Acid—One fluid ounce.
Water—Three fluid ounces.

2. The following plants do not require fumigation: Evergreens, Strawberry Plants, Bulbs and Tubers, Herbaceous Perennials, and Bedding Plants.

3. Damage may be done to stock (a) if fumigation takes place too early in the fall, before the buds are set, and the wood sufficiently dormant; and (b) if fumigation takes place late in the spring, after the buds have begun to swell.

4. The roots of stock should be exposed for as short a time as possible, both before and after fumigation. Experience shows that much injury has resulted from such exposures.

5. No nurseryman shall use chemicals other than those sent out under direction of the Inspector.

6. Nurserymen should bear in mind that a Certificate of Fumigation must be attached to every package of nursery stock sent from the nursery.

7. No fumigation house is to be used for fumigation purposes until sanction has been obtained from the Inspector.

8. Caution.—The cyanide is a deadly poison and shall be kept away from children and animals. Burns from the acid on the hands or face may be treated thus: Wash affected parts at once with water and cover with baking soda. If the burn is bad, brush off the soda and apply Carron-oil.

REGULATIONS FOR THE FUMIGATION OF NURSERY STOCK.

The following regulations have been prescribed by order of the Lieutenant-Governor in Council, in accordance with the provisions of the San Jose Scale Amendment Act, passed April 1st, 1899:

1. Fumigation must be carried on in a box, room, compartment or house suitable for the purpose, which must be air-tight, and capable of rapid ventilation. The owner or proprietor must notify the Minister as soon as preparation for fumigation is complete. The Minister will thereupon order an inspection of the fumigation appliances. No fumigation under the Act is to be carried on until such inspection has been made and a satisfactory report sent to the Minister.

2. The Inspector, after examining and measuring the box or house, or other compartment in which fumigation is to be carried on, will prescribe the amounts of material to be used for every fumigation, and the instructions as to the same must be carefully followed out. The Inspector may, if thought advisable, supply the material for each fumigation in weighed packages.

3. The fumigation house (which shall include all apparatus or appliances used in the fumigation, such as generators, etc.) is to be subject to the orders of the Minister on the recommendation of the Inspector. Subject to the approval of the Inspector, the fumigation house may be on other lots than those on which the nursery stock are growing.

4. The fumigation is to be by hydrocyanic acid gas, produced according to the instructions of the Inspector, and from such formula as he prescribes for the purpose.

5. The fumigation is to be continued for a period of not less than forty-five minutes. After the expiration of this time or longer, and when fumigation is complete, the house is to be thoroughly ventilated for fifteen minutes at least.

6. No person is to be allowed to enter the fumigating house until after the ventilation period has expired. Entering before may prove injurious, if not fatal, as the gas is a deadly poison.

7. The fumigation of buds and scions may be done in fumigation boxes of not less than thirty cubic feet capacity, the same to be subject to inspection and approval.

8. Immediately after inspection of the fumigation house, the Inspector will report to the Minister, and the Minister or Inspector will thereupon give permission in writing for the owner or proprietor to begin fumigation.

9. The owner or proprietor of every nursery will attach to every box and to every package of nursery stock a certificate as follows, and he will furnish every purchaser who so desires a copy of the same :

CERTIFICATE OF FUMIGATION.

This is to certify that this package of Nursery Stock consisting of

....

....

was properly fumigated on or about the...... .... day of ....1903, in accordance with the regulations prescribed by the Lieutenant-Governor in Council, in accordance with 62nd Victoria, Chapter 35.

....

....

AN ACT TO PREVENT THE SPREAD OF THE SAN JOSE SCALE.

61 Vict., Chap. 33, amended by 62 Vict., c. 35 and 63 Vict., c. 129.

1. This Act may be cited as The San Jose Scale Act.

2. In this Act the word "Minister" shall mean the Minister of Agriculture for the Province of Ontario.

The word "Plant" shall mean any tree, vine, shrub or plant, or any part of a tree, vine, shrub or plant, or the fruit of any tree, vine, shrub or plant.

The word "Scale" shall mean the San Jose Scale insect in any of its stages of development.

3. No person shall import or bring, or cause to be imported or brought into the Province of Ontario, for any purpose whatsoever, any plant infested with scale.

4. No person shall keep, or have, or offer for exchange or sale any plant infested with scale.

Amendments, 1902. Section 4.

(1) All persons owning, leasing or managing any orchard or collection of plants, other than a nursery, shall, when any plant therein becomes infested with the scale, and forthwith on becoming aware, whether by notice or otherwise, of such infestation, destroy such plant by fire, or shall effectually treat the scale by fumigation, or by spraying with crude petroleum, kerosene or soap, or by any other material prescribed by the Minister.

(2) The council of any city, town, township or incorporated village may, and upon the petition of fifteen or more ratepayers shall, by by-law, appoint at least one inspector to enforce the provisions of this Act in the municipality, and fix the amount of remunera-

tion, fees or charges he shall receive for the performance of his duties. All such appointments, as well as such remuneration, fees or charges, shall be subject to, and be only operative on the written approval of the Minister, communicated by him to the clerk of the municipality.

(3) Every inspector appointed by any by-law passed under subsection 2 of this section is empowered to act as inspector under The Yellows and Black Knot Act and under The Noxious Insects Act in all respects, as if he had been appointed as inspector under the last mentioned Acts by by-laws specially passed for that purpose.

(4) All such inspectors appointed shall be subject to and observe the regulations and directions of the Minister, and shall be subject and subordinate to the inspector appointed by the Minister, and in case of any neglect of duty, such inspector shall be subject to the penalties prescribed by this Act.

(5) The council of the city, town, township or incorporated village shall pay the remuneration, fees or charges of such inspectors, and shall be entitled to receive from the Department of Agriculture one-half of the amount so paid upon furnishing the Department with statements of the sums so paid, certified to by the inspector appointed by the Minister.

5. The owner or proprietor of any nursery shall not send out or permit any plant to be removed from his nursery without the same being first fumigated by hydrocyanic acid gas in accordance with regulations prescribed by order of the Lieutenant-Governor-in-Council.

6. No person shall sell or dispose of or offer for sale any plant obtained, taken, or sent out from a nursery unless the said plant has previously been fumigated in accordance with these regulations.

7. In case the inspector finds scale in any nursery and so reports to the Minister, the Minister may thereupon inform, in writing, the owner or proprietor or manager of said nursery of the existence of scale in his nursery, and the owner or proprietor or manager of said nursery shall not thereafter permit any plant or plants to be removed from the said nursery until he is notified in writing from the Minister that the inspector has reported to the Minister that it is safe in the public interest to permit the said nursery stock to be removed after fumigation.

8. For the purpose of scientific investigation the Minister may from time to time, by writing given under his hand, except such persons as he may deem proper from the operaton of the two preceding sections, and, while acting under such permission, such persons shall not be subject to the penalties imposed by this Act.

9. Any person having reason to suspect that any plant in his possession, or in his charge, or keeping, is infested with the scale, shall forthwith communicate with the Minister in regard to the same, and shall furnish the Minister with all such information in regard to the source or origin of the said infestation and nature of the same as he may be able to give.

10. (a) Whenever the scale exists, or is supposed to exist on any plant, the Minister may direct a competent person to make an examination and inspection, and may order that any plant so infested, or such part as he may deem advisable, shall be immediately destroyed by burning, either by the person appointed to make the inspection, or by the person owning or having possession of the said plant, or some other person so directed in writing, and the person so directed shall make a full report to the Minister in writing as to the nature and extent of the work so performed, together with a fair estimate of the value of the plant described.

(b) If, in the case of an orchard or collection of plants, the inspector finds scale on plants located in several different parts of the orchard or collection. and decides that it is advisable in the public interest to destroy all the plants in such orchard or in any part or parts thereof and so reports to the Minister, the Minister may direct that an examination or inspection shall be made by an additional inspector, and upon their advice in writing he may direct that all the plants in such orchard or such collection of plants or in such part or parts thereof shall be destroyed without requiring that every plant in the said orchard or collection shall be first examined.

11. For the purpose of enforcing this Act, it shall be the duty of every inspector appointed under The Yellows and Black Knot Act to make careful examination for the occurrence of the scale within the municipality for which he is appointed, and to report forthwith to the Minister every case of infestation, and neglect to make such report shall render the inspector liable to the penalties imposed under section 14 of this Act.

12. Any person appointed by the Minister under this Act to inspect, or to destroy any plant, for the purpose of enforcing the provisions of the Act, and any inspector appointed by the council of the municipality, shall, upon producing his authority in writing, have free access to any nursery, orchard, store, storeroom, or other place where it is known, or suspected, that any plant is kept.

13. Upon the recommendation of the Minister, there may be paid out of the Consolidated Revenue Fund of the Province to the owner of any plant so destroyed a sum not exceeding one-fourth of the value thereof (not including fruit) as reported upon by such officer or other competent person, appointed as aforesaid, but nothing in this section shall apply to any plant imported into the Province within a period of one year prior to the examination by the officer aforesaid.

14. Any person neglecting to carry out the provisions of this Act, or any person offering any hindrance to the carrying out of this Act, shall, upon summary conviction, be liable to a fine of not less than $20 nor more than $100, together with costs, and in default of payment thereof shall be subject to imprisonment in the common gaol for a period of not less than ten days nor more than thirty days.

15. The Lieutenant-Governor-in-Council may, by order, direct that other scale insects than the San Jose Scale may be included in the provisions of this Act, and thereafter during the continuance of such Order-in-Council the word "Scale" in this Act shall include all such other scale insects. Public notice of such Order-in-Council shall be given by publication in two successive issues of The Ontario Gazette.

16. Notwithstanding anything contained in The San Jose Scale Act, and the amendments thereto, the Lieutenant-Governor-in-Council may, upon the recommendation of the Minister of Agriculture, adopt regulations for the treatment of infested plants by spraying, washing or fumigation. These regulations shall be published in two successive issues of The Ontario Gazette, and such treatment may be allowed or authorized in the manner prescribed in the said Regulations in place of or prior to destruction by burning as provided for in section 7 of the said Act.

P. W. HODGETTS,

Inspector of Fumigation Appliances.

A LIST OF THE NURSERIES OF ONTARIO, 1903 .

Morris & Wellington, Fonthill	Fumigation houses, 2,800 cub. ft.
Morris & Wellington, Toronto	Fumigation at M. & W.
E. P. Blackford & Co.	Fumigation at M. & W.
Pelham Nursery Co., Fonthill	Fumigation at M. & W.
B. W. Secord, Fonthill	Fumigation house, 750 cub. feet.
J. E. Crow, Ridgeville	Fumigation house, 560 cub. feet.
J. W. Page, Ridgeville	
F. Walker, Virgil	Fumigation house, 866 cubic feet.
W. Lee & Son, Virgil	Fumigation house, 2,100 cubic feet.
E. Morden, Niagara Falls, South	Fumigation box, 120 cubic feet.
Smith, Reed Co., St. Catharines	Fumigation house, 1,550 cublic feet.
Titterington & Co, St. Catharines	Fumigation Smith, Reed Co.
A. G. Hull & Son, St. Catharines	Fumigation house, 960 cubic feet.
Alex. Glass, St. Catharines	Fumigation house, 240 cubic feet.
Neil Buchanan, St. Catharines	Fumigation by J. J. Collins.
J. J. Collins, St. Catharines	Fumigation house, 460 cubic feet.
H. Cawker, St. Catharines	Fumigation house, 500 cubic feet.
Brown Bros. Co., Brown's Nurseries	Fumigation house, 6,400 cubic feet.
Chase Bros. Co., Colborne	Fumigation by Brown Bros.
F. W. Bowman & Son, Toronto	Fumigation by Brown Bros.
E. D. Smith, Winona	Fumigation house, 2,300 cub. ft. and box
C. P. Carpenter & Son, Winona	Fumigation house, 1,318 cubic feet.
F. B. Henry, Winona	Fumigation by E. D. Smith.
J. E. Henry, Winona	Fumigation by E. D. S. & C. P. C. & Son.
Winona Nursery Co., Winona	Fumigation by E. D. Smith.
Grimsby Nursery Co., Grimsby	Fumigation by C. P. Carpenter & Son.
W. Smith, Grimsby	Fumigation by E. D. Smith.
W. D. Kitchen, Grimsby	
Webster Bros., Hamilton	Fumigation house, 240 cubic feet.
Ward Bros., Bartonville	Fumigation house, 642 cubic feet.
Brock Galbraith, Bartonville	Fumigation house, 320 cubic feet.
Fruitland Nursery Co., Fruitland	Fumigation box, 1,620 and 70 cub. ft.
M. Milgau, Bright	Fumigation house, 1,377 cubic feet.
E. Hersee, Woodstock	Fumigation house, 630 cubic feet.
A. W. Graham, St. Thomas	Fumigation box, 62 cubic feet.
H. L. McConnell, Lakeview	Fumigation house, 400 cubic feet.
C. A. Baker, London	Fumigation house, 510 cubic feet.
D. Dempsey, Stratford	Fumigation house, 100 cubic feet.
J. McAinsh, Wellburn	Fumigation house, 145 cubic feet, box 52 1-2 cubic feet.
Strathroy Nursery Co., Strathroy	Fumigation house, 72 cubic feet.
Estate of J. Stewart, Goderich	Fumigation house, 300 cubic feet.
J. W. Skinner, Mitchell	Evergreens.
Chas. Ellis, Meaford	Fumigation house, 475 cubic feet.
J. H. Wismer, Port Elgin	Fumigation house, 900 cubic feet, box 45 cubic feet.
W. Fleming, Owen Sound	Fumigation house, 500 cubic feet.
S. H. Newman, Owen Sound	Fumigation house, 250 cubic feet.
T. C. Robinson, Owen Sound	Using S. H. Newman's house.
W. M. Robinson, Kettleby	Fumigation house, 300 cubic feet.
Steele, Briggs Seed Co., Toronto	Fumigation box, 75 cubic feet.
W. Rennie & Sons, Toronto	
J. A. Simmers, Toronto	
A. Gilchrist, Toronto Junction	
Manton Bros., Eglinton	
Granger Bros., Deer Park, Toronto	
Stanley Spillett, Nantyr	
R. Breckon, Toronto	
Colin McDonald, Toronto, 1,164 Queen St., East	Fumigation house, 305 cubic feet.
Thos. Rowley, Leamington	Fumigation house, 875 cubic feet.
S. Ward Kennedy, Leamington	Fumigation house, 600 cubic feet.
Geo. Cady, Ruthven	Fumigation house, 860 cubic feet.
McKenzie Ross' Sons, Chatham	Fumigation house, 915 cubic feet.
N. E. Mallory, Guilds	Fumigation house, 144 cubic feet.
N. T. Selby, Newcastle	Fumigation house, 560 cubic feet.

R. J. Mackie, Oshawa	Fumigation house, 385 cubic feet.
L. K. Shourds, Wellington	Fumigation house, 1,000 cubic feet.
Wallace Woodrow, Picton	Fumigation house, 500 cubic feet.
W. C. Reid, Belleville	Fumigation house, 190 cubic feet.
J. W. Johnston, Campbellford	Fumigation house.
H. A. McIntosh, Dundela	Fumigation house, 72 cubic feet.
Thos. Dangerfield, Kemptville	Fumigation house, 640 cubic feet.
W. G. Conn, Kemptville	Fumigation house, 640 cubic feet.
Renfrew Nursery Co., Renfrew	Fumigation box, 96 cubic feet.
David Tait, Iron Bridge, Algoma	
Campbell Bros., Simcoe	
Hunter & Son, Hawthorne Nurseries, Scotland	
Chas. Fisher & Son, Fenwick.	

THIRTY-FOURTH ANNUAL REPORT

OF THE

ENTOMOLOGICAL SOCIETY

OF

ONTARIO.

1903.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO).

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO.

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1904.

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TORONTO.

Rev. George William Taylor, F.R.S.C., F.E.S., F.Z.S.

PLATE 1. The Kottmeier orchard of about 400 plum-trees at St. Catharines treated with the McBain Carbolic Wash. (Pho. Aug. 14, 1903). (See pages 42 to 45.)

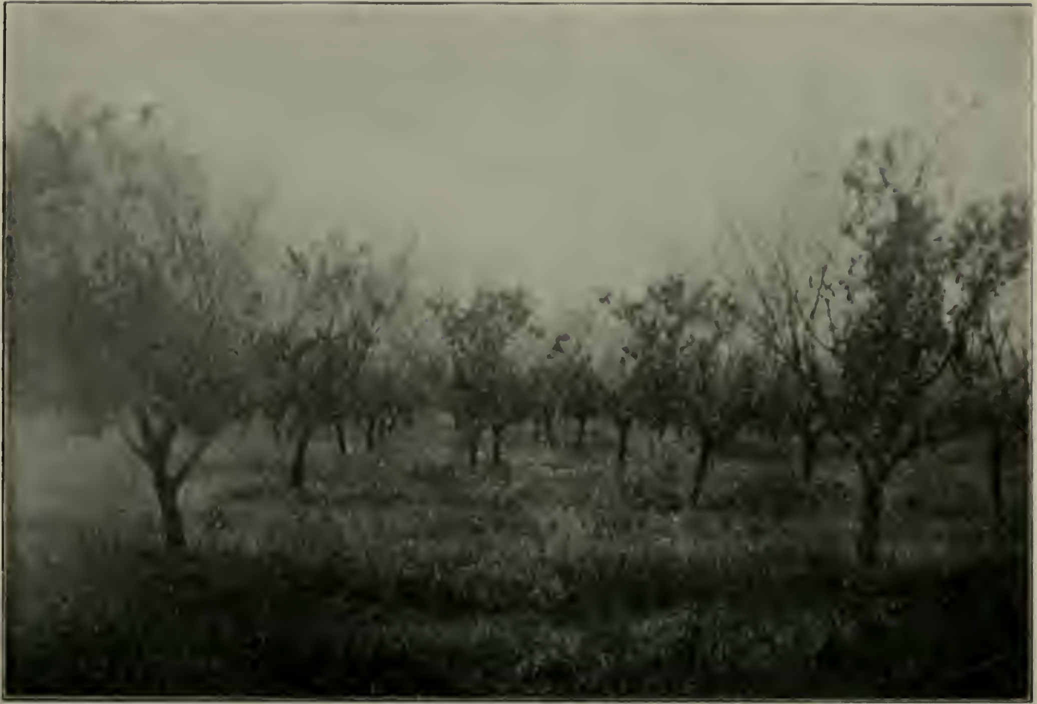

PLATE 2. A peach orchard near St. Catharines practically destroyed by the San Jose Scale, containing 10,000 trees, now neglected and left untreated. (Photo. Aug. 14, 1903.)

PLATE 4. An apple orchard belonging to John D. Wigle, Kingsville, sprayed with lime, sulphur and salt in early spring. Very few scales could be found at time of visit. (Aug. 27, 1903.)

PLATE 3. A large apple orchard near Kingsville very badly encrusted with San José Scale. The owner refused to treat the orchard himself, or to allow the township sprayer to do it for him. This orchard is now a menace to the neighboring ones. (Photo. Aug. 27, 1903.)

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THIRTY-FOURTH ANNUAL REPORT

OF THE

ENTOMOLOGICAL SOCIETY OF ONTARIO

1903.

To the Honorable John Dryden, Minister of Agriculture :

SIR,—I have the honor to present herewith the Thirty-Fourth Annual Report of the Entomological Society of Ontario.

The Fortieth Annual Meeting was held in Ottawa, on Thursday and Friday, September 3rd and 4th, 903. A full account of the proceedings, with the papers read and reports submitted from the various Officers, Sections and Branches of the Society, will be found in the following pages.

The *Canadian Entomologist*, the monthly organ of the Society has been regularly issued during the year, and has now completed its thirty-fifth volume, which in scientific value and interest fully maintains the high reputation which it has so long held.

I have the honor to be, Sir,

Your obedient servant,

CHARLES J. S. BETHUNE,

LONDON, ONTARIO.

Editor.

OFFICERS FOR THE YEAR 1903-1904.

President .... Professor William Lochhead, B. A., M. S., Ontario Agricultural College, Guelph.

Vice-President . J. D. Evans, C. E., Trenton.

Secretary. ... .. W. E. Saunders, London.

Treasurer . .. .. J. A. Balkwill, London.

Directors ..... Division No. 1—C. H. Young, Hurdman's Bridge.
Division No. 2—C. E. Grant, Orillia.
Division No. 3—J. B. Williams, Toronto.
Division No. 4—G. E. Fisher, Freeman.
Division No. 5—R. W. Rennie, London.

Directors Ex Officio—(Ex-Presidents of the Society)—Professor William Saunders, L. L. D., F. L. S., F. R. S. C., Director of the Experimental Farms, Ottawa; Rev. C. J. S. Bethune, M. A., D. C. L., F. R. S. C., London; James Fletcher, L. L. D., F. L. S., F. R. S. C., Entomologist and Botanist of the Experimental Farms, Ottawa; W. H. Harrington, F. R. S. C., Ottawa; John Dearness, B. A., Vice-Principal, Normal School, London; Henry H. Lyman, M. A., F. R. G. S., F.E. S., Montreal; Rev. T. W. Fyles, D. C. L., F. L. S., South Quebec.

Librarian and Curator—J. Alston Moffat, London.

Auditors—W. H. Hamilton and S. B. McCready, London.

Editor of the Canadian Entomologist—Rev. Dr. Bethune, London.

Editing Committee—Dr. J. Fletcher, Ottawa; H. H. Lyman, Montreal; J. D. Evans, Trenton; W. H. Harrington, Ottawa; Prof. Lochhead, Guelph.

Delegate to the Royal Society—Rev. Dr. Bethune, London.

Delegates to the Western Fair—J. A. Balkwill and W. E. Saunders, London.

Finance Committee—Dr. Bethune, J. Dearness and the Treasurer.

Committee on Field Days—The Chairmen of the Sections and Dr. Woolverton, Messrs. Balkwill, Bowman, Law, Moffat, Rennie and Saunders, London.

Library and Rooms Committee—Messrs. Balkwill, Bethune, Bowman, Dearness, Moffat, and Saunders, London.

THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

ANNUAL MEETING.

The fortieth annual meeting of the Entomological Society of Ontario, was held at Ottawa on Thursday and Friday, September 3 and 4, 1903. The chair was taken by Professor Wm. Lochhead of the Ontario Agricultural College, Guelph, President. Among the members present were Messrs. H. H. Lyman, A. F. Winn, Charles Stevenson, G. A. Moore and A. E. Norris, Montreal; Mr. John D. Evans, Trenton; Messrs. J. B. Williams and C. H. Tyers, Toronto; Rev. Dr. Bethune and Mr. W. E. Saunders, London; Dr. James Fletcher, Messrs. Arthur Gibson, W. H. Harrington, Baldwin and others, Ottawa, Mr. C. H. Young, Hurdman's Bridge. The Society was also favoured with the presence of Dr. L. O. Howard, United States Entomologist, of Washington, D. C., who took part in the discussions.

Letters expressing regret at their inability to attend were received from the Rev. Dr. Fyles, South Quebec; Mr. C. E. Grant, Orillia; Mr. E. M. Walker, Toronto; Mr. G. E. Fisher, Freeman; Mr. Dwight Brainerd and Mr. G. Chagnon, Montreal; Mr. J. A. Balkwill and other members residing in London; and from Prof. C. C. James, Deputy Minister of Agriculture for Ontario, explaining the absence of the Hon. J. Dryden and himself owing to engagements in connection with the Dominion Exhibition at Toronto.

During the morning of Thursday, September 3, a meeting of the Council was held in the Board of Trade Room, Elgin Street, Ottawa, which was kindly placed at the disposal of the Society during both days' sessions. It was decided that sheet cork and Entomological pins should be sold to ordinary members (that is those residing in Canada) at cost price; to dealers in Canada from whom students procure supplies at 5 per cent. and to others at twenty per cent. advance on cost. The Treasurer's report was discussed and in consideration of his statement shewing that the balance at the close of each financial year had been steadily declining during the last six years and that therefore the Society was evidently spending more than its income, certain economies were resolved upon which, it is expected, will place the funds in a more satisfactory condition. After the preparation of the annual report the Council adjourned.

In the afternoon the Society met at 2.30 o'clock, the President, Prof. Lochhead, in the chair. The Reports of the Council, the Treasurer, and the Librarian and Curator were read and adopted; also the reports from the Branches and Sections of the Society and those of the Directors on the insects of the year. At the close of the reading of the last mentioned there followed a general discussion on the insects referred to and much useful and interesting information was given. A number of papers were also read and specimens exhibited in illustration.

THE REPORT OF THE COUNCIL.

The Council of the Entomological Society of Ontario begs to present its report for the year 1902-3.

It has much pleasure in drawing attention to the fact that it is now forty years since the Society was organized, the first meeting having been held in April, 1863. Three of the original members, Dr. William Saunders, Rev. Dr. Bethune and Mr. E. Baynes Reed have continued to take an active interest in the welfare of the Society from that time to the present, Dr. J. H. Sangster of Port Perry, is another surviving member of the original small band of Entomologists who met in Toronto two score years ago.

The thirty ninth annual meeting of the Society was held in London in October, 1902, and was well attended by members from a distance as well as by those resident in the neighborhood. It was also favoured with the presence of Prof. C. C. James, Deputy Minister of Agriculture for Ontario. During the first afternoon a conference was held to discuss the prevalence of the Pea Weevil in Ontario and to consider the best means of controlling its ravages, which have of late years become very serious. Valuable information was given on the various aspects of the subject by Dr. Fletcher, Prof. Lochhead and others, and a resolution was adopted calling the attention of the Superintendent of Farmer's Institutes to the matter and suggesting that it should be brought prominently before all their meetings, and that object lessons in fumigating peas should be given throughout the country. A public meeting was held in the evening at the Normal School when the presidential address was read by the President, Rev. Dr. Fyles, and Prof. Lochhead gave a lantern lecture on some common Butterflies and Butterfly Hunters. The remaining sessions were occupied with a series of valuable papers, reports of officers, etc., and the examination of interesting specimens.

The thirty third Annual Report on economic and general Entomology was presented to the Minister of Agriculture for Ontario in January last and was printed and distributed in March. It contained 132 pages illustrated with 108 engravings in the text and photogravure portraits of Messrs. E. Baynes Reed for many years an efficient officer of the Society and W. E. Saunders the present energetic Secretary. Besides the account of the conference on the Pea Weevil and the proceedings at the annual meeting the Report contained papers on the injurious insects of the year by Messrs. Fisher, Young, Evans, Walker, Balkwill, Stevenson, Moffat, Prof. Lochhead and Dr. Fletcher; "Notes on Danais archippus" by Mr. Lyman; "The Paper-making Wasps of the Province of Quebec" by Dr. Fyles; "Some interesting habits of Lepidopterous Larvæ" and "Notes on Semiophora Youngii" by Mr. Gibson; "The Entomological Record for 1902" by Dr. Fletcher, and Mr. Harrington; "A Key to Orchard Insects," profusely illustrated, by Prof. Lochhead; "Notes on insects injurious to Pines" by Mr. Harrington; and "A talk about Entomology" by Mr. Moffat. The volume closed with a report from the North-west (Canada) Entomological Society and biographical sketches of Messrs. E. Baynes Reed and W. E. Saunders.

The Canadian Entomologist has been regularly issued at the beginning of each month. The 34th volume was completed in December last; it consisted of 339 pages, illustrated with three full-page plates and twelve figures from original drawings. The contributors numbered forty-seven and represented Canada, the United States, Germany and Russia. Of the 35th volume eight numbers have thus far been published, and the number for September will be issued immediately.

During the greater part of the year meetings for the study of Entomology have been held on Saturday evenings, alternately with those of the Botanical and Microscopical Sections. Owing to the unfavorable weather, very few collecting excursions have been made. The Ornithological Section has also held regular monthly meetings, but the Council much regrets that the Geological Section has suspended its operations for some months past. It is hoped, however, that its sessions will be resumed during the coming winter. The reports of the Branches, at Montreal, Quebec and Toronto, will be presented at this meeting, as well as those from the Sections and Officers, and will be published in due course.

The good work of the Society has been much extended by the delivery of lectures on subjects connected with the relations of insects with the various important industries of the Country. The President, Prof. Lochhead in addition to his official work as Professor of Biology at the Ontario Agricultural College at Guelph, has delivered many lectures at Farmer's Institutes and other meetings of farmers, horticulturists and fruit-growers. Dr. Fletcher has just completed two extensive series of farmers' meetings in the North West Territories and

British Columbia at all of which injurious insects were treated of to some extent. Prof. Lochhead and Dr. Fletcher among others have also taken an active part in developing the new Nature Study movement in the Educational Institutions of the Country. Mr. W. E. Saunders has continued to give interesting addresses on "The Birds of Canada" to meetings of teachers and others in various towns of Weatern Ontario, and Dr. Bethune has given a practical address to the market gardeners of London on some insects affecting their crops.

Judging from the frequent requests for our Annual Reports from teachers of our High and Public Schools, we believe that the work of this Society is appreciated by those who are trying to open up the wonderful field of insect life, and to understand the best ways of dealing with injurious pests.

We note with satisfaction the purchase by the Ontario Government of Dr. Brodie's large and valuable collection of insects. This collection can now be made available for study and reference, and should be a means of increasing the interest in Entomology.

All of which is respectfully submitted.

W. Lochhead,
President.

REPORT OF THE MONTREAL BRANCH

The 249th regular and 30th Annual Meeting of the Montreal Branch of the Entomological Society of Ontario was held in the library of the Natural History Society, University Street, on Monday, May 11th 1903.

The following members were present: Messrs. Charles Stevenson (President), H. H. Lyman, A. E. Norris, M. W. Davis, A. Griffin, A. F. Winn, G. R. Southee, D. Brainerd and G. A. Moore.

The Chair was taken by the President and the minutes of the last meeting were read, and minutes of last annual meeting taken as read, and confirmed.

The President then read the following report on behalf of the Council:

Report of the Council.

The Thirtieth Annual Report of the Council of the Montreal Branch of the Entomological Society of Ontario:—

In presenting their annual report for the season 1902-3, the Council have much pleasure in congratulating the Branch on its having attained its thirtieth year of continuous existence.

During the season eight regular meetings have been held with an average attendance of eight, at one of which we had the pleasure of the attendance of Rev. Dr. T. W. Fyles, and the following papers were read:—

1. Annual Address of the President..................G. Chagnon.
2. What is a Genus? ....H. H. Lyman.
3. Notes on the season 1902........................Charles Stevenson.
4. Notes on the season 1902........................H. H. Lyman.
5. Random notes on Lepidoptera, 1902...............A. F. Winn.
6. A Wingless Fly..................................Charles Stevenson.
7. Notes on Canadian Species of the Genus Apantesis (Arctia) with special reference to the Larvae.......A. Gibson, Ottawa.
8. Wasps of the Province of Quebec.................Rev. Dr. T. W. Fyles.
9. The Stink bugs and their allies (Pentatomidæ)......G. A. Moore.
10. A Few Days at Quebec...........................A. F. Winn.
11. Pseudoscorpions................................Charles Stevenson.
12. A New Device for inflating Caterpillars...........D. Brainerd.

13. A Card System for Notes on Insects ....A. F. Winn.
14. Notes on Coleoptera.............. ....Charles Stevenson
15. A New Capsid, Lygus Chagnoni. .. ..Charles Stevenson.
16. Additions to the Syrphidae of the Province of Quebec. G. Chagnon.
17. Further Notes on Haploa........ . . .. H. H. Lyman.
18. Lantern Exhibition of Lepidopterous slides. .. ...A. E. Norris assisted by A. Griffin

Three field days were held, twice to Piedmont in June and once to St. Hilaire in July. There was also good collecting done by the members individually at Trembling Mountain, Rigaud, Quebec, in Chambly, Laval and Rouville Counties as well as Montreal Island.

We have received two new members, Masters G. R. Southee and A. Denny.

For some time it was found difficult to fix an evening on which to hold the meetings. Your Council believe that the second Monday of the month has proved the most convenient to the members.

The Branch is greatly indebted to Mr. A. E. Norris for his care and guardianship of the Cabinet.

The finances of the Branch are in a satisfactory condition as will be shown in the Secretary-Treasurer's Report. But it will be seen by the Curator and Librarian's report there is not as much interest taken in the cabinet and Library as might be.

Respectfully submitted on behalf of the Council.

(Signed) CHARLES STEVENSON,

President

The Treasurer then submitted his report, showing a balance of $68.85. on hand

The Librarian and Curator then presented his reports, which showed that additions had been made to the Library by A. Griffin, H. H. Lyman, Charles Stevenson and the South London Entomological Society, and the first 10 volumes of the Canadian Entomologist had been added to the Library, several complete volumes and some incomplete ones being presented by Mr. Griffin and the other volumes and missing parts purchased and the whole bound in 5 volumes.

The following gentlemen had presented drawers to the cabinet, A. F. Winn 1, G. Chagnon 1, A. E. Norris 1, G. A. Moore 1, Charles Stevenson 1, H. H. Lyman 2, D. Brainerd 3 and M. W. Davis 1.

Mr. H. H. Lyman moved that the reports be received and adopted, seconded by A. F. Winn. *Carried.*

The President then read his Annual Address.

The following officers were elected for the coming year: – President, Charles Stevenson; Vice-President, D. Brainerd ; Librarian and Curator, A. E. Norris ; Secretary-Treasurer, Geo. A. Moore ; Council, H. H. Lyman, G. Chagnon and A. F. Winn.

Mr. A. E. Norris then gave an illustrated talk on "Method of coloring photographic lantern slides of butterflies."

Mr. H. H. Lyman read a paper on "The Lepidoptera of Kirby's Insects of the Fauna Boreali-Americana."

Mr. H. H. Lyman exhibited a piece of wood, the property of the Natural History Society, showing marks probably made by a beetle.

It was then decided to hold an outing on Victoria Day, May 25th to St. Hilaire.

The meeting then adjourned.

GEO. A. MOORE,

Sec-Treas.

REPORT OF THE QUEBEC BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The annual meeting of the Quebec Branch was held on the 11th November, 1903, the President Rev. Dr. Fyles, occupying the chair.

The President read his report as follows ;

PRESIDENT'S REPORT.

The season of 1903 has not been a favorable one for Entomological pursuits. It began early at Levis : on April the 11th, at 3 o'clock in the afternoon, the thermometer stood at 82° in the shade, and *Pieris rapæ*, L was to be seen at Dandelion heads. On Easter Day I saw a specimen of *Vanessa Atalanta*, L. on the wing. In May and the early part of June, the weather was intensely cold and dry ; and forest fires raged in many places around us. A lumbering establishment belonging to one of our members was burned at this time.

On the 3rd of June, I went to Bergerville, hoping to secure some female specimens of *Chionobas jutta*, Hubner, for my friend Mr. Newcomb of Boston, and to see what the prospects were for an agreeable outing for the members of our Branch. I found that the ‘ Gomin" was not a *swamp*, but an arid waste of withered sphagnum, over which one walked as upon a Brussels carpet. There were no flowers, except a very few straggling blossoms of Kalmia and Ledum. To add to the strangeness of the scene, the air was thick with smoke through which the sun appeared like a copper disk. At length it was completely obscured ; and the gloom was like that of nightfall on a foggy day. Not a solitary Jutta was to be seen.

I walked down to the warf at Sillery, and found that the boat could not run on account of the smoke ; so I turned and trudged along under the cliff till I came to Wolfe's Cove, where I climbed the ascent. I then crossed the Plains to the Street-car limits. My experiences on this occasion did not encourage me to ask the members of our Branch to hold a field-day.

The dry time was followed by a cold, wet, miserable spell during which out-door Entomological work was impossible.

Then a gloom was thrown over all our members by the death of that most excellent lady the wife of our kind Secretary-Treasurer Col. Lindsay. We grieve in sympathy with him and his family in their great loss.

The illness of Mr. George Addie obliged him and his family to leave Levis ; and. in consequence, we have lost from our members Miss Kate Addie, who was her father's faithful nurse. Mr. Addie died at Marbleton on the 3rd instant.

Concerning insects that have come under my observation during the season, the following particulars may be interesting :—

CASSIDA VIRIDIS, LINNEUS.

This species first appeared, this year, on the 29th of May, and continued in evidence till October the 21st. References to it will be found in the October number of the *Canadian Entomologist* for 1902, and in the January number of the same Magazine for the present year. The description I gave in the number for October, 1902 was correct. To it I would add,—the wings are somewhat smoky and have dark brown veins. The black abdomen has a yellow border on the upper side.

Concerning this species Dr. L. O. Howard, Entomologist to the U. S. Department of Agriculture , has kindly given me valuable information. He says :—

" Any leaf-feeder which has as wide a range of food plants as indicated by the burdock and thistle cannot be relied upon to be at all dainty in its diet, and may very readily become an important enemy of cultivated crops, such as the beet for example, and the importation of such a beetle may be the cause of lasting regret in future years. Another Old World species, *Cassida nebulosa*, which normally feeds on various weeds, has been known to devastate large areas of sugar beets and is one of the most important enemies of the beet crop. These fears may be entirely groundless; nevertheless, the known food habits of near allies of this beetle go far to substantiate my fears. The food plants of *Cassida viridis*, Linn, have been noted by different writers.

According to Panzer, it feeds on Labiates; several authors record it on Mentha; Linnaeus, on Lycopus; Dr. Schmidt, on *Melissa officinalis*, Nepeta and Salvia, but *Cirsium arvense* appears to be the favourite food of larva and adult."

CIMBEX AMERICANA, LEACH.

In the lane leading from the Cove to the Plains of Abraham, on the occasion I have mentioned, I found, lying on its back, a remarkable specimen of *Cimbex Americana*, Leach. I have in my collection the typical form, the larva of which feeds here upon the Alder, *Alnus incana*, Wild, also the *Cimbex ulmi* of Peck (both the spotted and unspotted forms) which, by the by, feeds at Levis on the Paper Birch, *Betula papyracea*, Ait., and a variety in which, instead of spots, there are broad bands of yellow on either side, which almost meet at the top. But in all these varieties the wings are clear, or somewhat smoky, with a brownish border at the hind margin, whereas, the specimen I allude to has all the wings of a rich dark purple, like one of *Trogus Brullei*, Cresson, and *T. fulvipes*, Cres. Can this be the *Cimbex violacea* of St. Fargeau?

ALEYRODES VAPORARIORUM, WESTWOOD.

Last Winter two of our members, Miss Bickell and Miss Freeman, found their house plants badly infested by a new pest—a diminutive white fly, very delicate and beautiful, but very mischievous. It appeared in great numbers especially on plants of Eupatorium and Fuchsia. I made enquiries of several naturalists concerning this; and Mr. W. E. Britton, State Entomologist of Connecticut, very kindly sent me a copy of Bulletin 140, written by him, and issued from the New Haven Experiment Station. In this well written and beautifully illustrated bulletin much information concerning this species is given. Mr. Britton informs me that Quebec is the most northern locality from which the appearance of the insect has been recorded.

TORYMUS THOMSONI, NEW SPECIES.

In the first week of July my attention was drawn by my friend, Mr. Joshua Thompson of Levis, to a strange sight, The plum-trees in his grounds were infested with myriads of a new species of Torymus, as many as 30 of the insects appearing on one plum. I never witnessed anything, in my Entomological pursuits, more remarkable. The brilliant little creatures could be seen in the act of depositing their eggs; their ovipositors thrust deep into the fruit. Some of the plums attacked shewed signs of a previous attack by the Curculio, but most of them did not. Whether the larvæ of the species feed on the flesh and juices of the plum, or attack the grubs of the Curculio I cannot say, for I was unable to follow the life-history of the species. The following is a description of the fly:—

Body a brilliant metallic green. Thorax punctate; prothorax rounded; meta-thorax large and elevated; scutellum arched. Trocanters and femora of the same colour as the body; the rest of the legs cerate; tibiæ spurred; tarsi five-jointed—the two last joints somewhat darkened. The antennæ brown, clavate; scape, rather long; club three jointed. Eyes, oval, large and full, of a warm purple, with a pale rim, and set with short hairs; ocelli purple. Wings with short ciliæ, iridescent: vein of fore-wing widened where it bends to the costa and for the rest of its length, bristly ; the stigmal vein knobbed. Plates above and below the insertion of the wings purple. Ovipositor dark brown, stout, as long as the body. Total length of the insect three millimetres.

I may say that all the fruit attacked by this insect fell to the ground. I have named the species after Mr. Thompson who drew my attention to it.

SERICORIS AGILANA, CLEMENS.

In June I found a leaf-crumpling larva feeding upon the Meadow Sweet, *Spirea salicifolia*, L. It was five lines in length, of a dark brown. The head was black ; second segment, chestnut edged next the head with cream colour. The segments were surrounded with brown tubercles. The true legs were glossy black ; the pro legs brown. On the body were a few bristles. The insect spun a close-fitting white cocoon which was wrapt in dry leaves. The moth, a beautiful little Tortrix, made its appearance on the 29th of the month. It was *S. agilana*, Clemens.

GRYLLUS DOMESTICUS, OLIVER.

In the 32nd Annual Report, page 93, I gave a short account of the male of this species. On the 7th of September, about 10 o'clock at night, a female of the species flew to the lamp on my table, and I was able to secure it. The dimensions of the insect were as follows: Length of body, six-tenths of an inch ; length of antennæ, eight-tenths ; of ovipositor, four-tenths ; of wing-covers, four-tenths. Total length of hind-legs, one inch.

The head was yellow with three dark brown bars across it. The eyes were oval, dark brown in colour, somewhat protuberant. The first joint of the setaceous antennæ was large and yellow ; the other joints were brown. The wing-covers were the colour of fresh hay, with numerous cross veins somewhat lighter in colour. The under wings extended far beyond the body, and were closely pleated. The abdomen was brown with yellow markings The ovipositor was brown The femora were covered with a short pile ; the tibiæ, spined on both sides, and with longer spines at the tarsal joint. General appearance of the under side of the insect ochreous.

The males of the species commenced chirruping, in my house, on the 19th of the month.

WASPS.

In the Spring of this year a female *Vespa diabolica*, Saussure, formed its nest in the hollow wood work of one of the side posts of the steps leading to the front entrance of the residence of J. Simmons, Esq. one of our members. As the summer advanced this post presented a busy scene, with the constant in-coming and out-going of the workers. In August the male wasps appeared.

I have taken this season what I believe to be a specimen of *Vespa vulgaris*, Linneus. I can find no difference between it and specimens of the species sent to me from Paris, by M. du Buysson.

The nesting habits of some of our wasps are these ;

V. vulgaris, *V. Germanica* and *V. rufa* form their nests in hollows in the ground.

V. arenaria, on stones etc , near the ground. *V. media*, under the eaves etc., of buildings.

V. maculata, suspended from branches of trees and shrubs.

LATE INSECT APPEARANCES.

On September the 16th, I took a fine fresh specimen of *Pyrameis cardui*, Linn. on Levis Heights.

On the 21st of the same month, I saw fresh specimens of *Danais Archippus*, Fabr. and *Vanessa Antiopa*, Linn. on the wing at St. Bruno.

On Sept. 30th, I found, on the sidewalk of D'Auteuil Street, a female specimen of *Ectobia Germanica*, Stephens carrying its egg-capsule, evidently seeking a fitting place in which to deposit it.

On November 4th at St. Romuald, I saw a neuropteron and a moth on the wing.

I have this season added two names to our Quebec list of Dragon flies, viz., *Sympetrum* (*Diplax*) *obtrusum*, Hagen, and *Sympetrum* (*Diplax*) *semicinctum* Say.

Even in a poor season then, things of interest to the naturalist come under our observation.

In conclusion I will express the hope that well-attended meetings of our Branch may be held regularly through the winter, and that we may spend many pleasant hours in the consideration of the wonders of the insect world.

Lt. Col. Lindsay said:

"Another remarkable fact noticed during the peculiar summer we had was that the insect pests that are so annoying to surveyors, lumbermen and fisherman in June and July were scarce this year. The midges which make life in our woods unbearable in July were hardly noticed the large early mosquitoes came out earlier than usual and after their disappearance there were few of the smaller and more venomous ones. There were also few black flies but, on the other hand, these lasted until October, a thing never noticed before, according to lumbermen who had been in the woods for years."

The Rev. W. W. MacQuaig stated that the year had been a poor one not only for Entomological but also for Botanical research. He had noticed that the Fungi especially had been scarce. In the season for Gasteromycetes not a puff ball was to be seen.

The Secretary Treasurer also submitted his report which was adopted.

The following officers were elected :—President, Rev. Dr. Fyles ; Vice-president, Miss E. MacDonald ; Council, Hon. R. Turner, Rev. W. W. MacQuaig, Mrs. R. Turner, Miss Bickell, Miss Freeman ; Secretary-Treasurer, Lt. Col. Crawford Lindsay.

The list of members now shows 23 adults and 3 juniors.

REPORT OF THE TORONTO BRANCH.

At the Annual Meeting of the Toronto Branch of the Entomological Society of Ontario, held in the Education Department Building on May 1st, 1903 the president Mr. E. M. Walker in the chair, the following Report for the year 1902-3 was read by the Secretary.

During the past year, eight meetings have been held, and the following papers have been read before the Society:—

"Algonquin Park from an Entomologist's standpoint"	E. M. Walker.
"The Milkweed Butterfly"	H. H. Lyman.
"An Assam Danais ; and its Mimics"	Chas. Stevenson.
"Toronto Butterflies in 1902	J. B. Williams.
"How to popularize Natural History, especially Entomology"	Paul Hahn.
"The genus *Podisma* in Eastern North America"	E. M. Walker.

One meeting was occupied with an "Exhibition of Specimens"

Our December meeting, when Mr. Lyman read his paper on the Milkweed Butterfly, was a very successful one, a number of the Natural History Society members attended, and in addition to his paper Mr. Lyman gave us an extremely interesting account of the occurrence of the Ghost Moth (*Hepialus thule*) in and around Montreal, and of the efforts made to secure specimens.

A few members went to High Park on the 24th of May ; and it was intended that we should join the Natural History Society in an excursion to Black Creek on July the 26th, but the weather, unfortunately, prevented any such excursion from taking place.

Mr. James McDunnough, a former member of the Society, now living in Europe, has presented us with a large cabinet of Lepidoptera, and a small cabinet of Coleoptera,—all collected some years ago while he resided in this country. Thirteen drawers of the large cabinet contain North American Lepidoptera, and six of them are filled with a very good series of European butterflies and moths.

Mr. Walker has presented us with his collection of Beetles and is arranging them in the Museum drawers, with those that are already in the collection. Mr. Maughan and Mr. Williams have also presented some specimens to the Museum.

As in previous years, we subscribed for the "Entomological News"—the Bulletins of the New York State Museum, and the "Journal of the New York Entomological Society," and as our funds were rather low our President has kindly supplied the means for continuing our subscriptions to this last named Journal, for the present year.

Papers on Entomological subjects have also been received from the Central Experimental Farm at Ottawa, the United States Department of Agriculture at Washington, from Cornell University, and other sources.

Four new members have been added to our roll during the year, and we have not had any resignations; our recent meetings, also, have shown a gratifying increase in the average attendance; and we feel sure that the Branch will go forward, and prosper.

(Signed) E. M. Walker, President.
J. B. Williams, Secretary.

Toronto, May 1st, 1903.

The following officers were elected for the ensuing year;—President, Dr. E. M. Walker; Vice President, Paul Hahn; Secretary-Treasurer, John Maughan jr., Librarian and Curator, J. B. Williams; Members of Council, J. H Webb, G. M. Stewart, and W. J. Fraser.

REPORT OF THE TREASURER.

Financial statement of the Treasurer of the Entomological Society of Ontario for the year ending August 31st 1903.

Receipts.		Expenditure.	
Cash Balance September 1st, 1902.	$414 18	Printing, etc.	$700 30
Subscriptions	377 94	Expense, Annual Meeting and Reports.	323 60
Proceeds from sale of Pins and Cork	36 12	Salaries	375 00
Advertising	37 75	Rent	175 00
Sales Entomologist and Reports	83 15	Library	9 03
Government Grant	1,000 00	Expenses—Sundry	50 17
Interest	7 30	Insurance	30 00
		Balance	293 34
Total	$1 956 44	Total.	$1,956 44

Auditors: { W. H. Hamilton.
S. B. McCready.

Treasurer: Jas. H. Bowman.

REPORT OF THE LIBRARIAN AND CURATOR.

For the year ending August 31st 1903.

The number of bound volumes received during the year was seventeen. Three of them were contributed by Dr. Bethune; one of which was Prof. Otto Lugger's 5th Annual Report of the University of Minnesota, which was wanting in the Society's Library.

Twenty-five were otherwise added to the Library two of them, contributed by Dr. Fletcher, being the last two volumes of the American Association for the Advancement of Science, to maintain the series. Making a total of forty-two volumes added during the year.

The full number now on the Register is 1804. Number of books loaned during the year, Ten. Several valuable additions have been entered upon the accession list of native insects during the year. The most important of which is a perfect specimen of that rare and interesting Stalk boring noctuid *Hydroecia appassionata*, Harv., contributed by Mr. H. Bird, Rye N. Y. The first specimen of this attractive moth was taken at London Ont. and named and described by Leon F. Harvey in the "Canadian Entomologist" Vol. viii, Page 155, 1876, and is now to be seen in the British Museum collection.

Some highly interesting specimens of Carpenter Bees and their work, were contributed by Mr. C. T. Ramsden, Cuba.

Respectfully submitted

J. Alston Moffat,

Librarian & Curator.

REPORT OF THE BOTANICAL SECTION.

The Botanical Section of the Entomological Society of Ontario met for organization on the 2nd of May, 1903, when the following officers were elected for the ensuing year.—Chairman, Mr. J. A. Balkwill; Vice Chairman, Mr. S. B. McCready; Secretary, Master H. C. Rennie.

Eight regular fortnightly meetings were held during the season at which there was a satisfactory attendance both of members and visitors. Owing to unfavourable weather no field excursions were made.

At all the meetings a number of interesting plants were exhibited and examined, Mr. Balkwill and Mr. Bowman being the chief contributors. Though no papers were read, great interest was maintained at all the meetings and much practical information regarding the plants in the neighborhood of London was given.

H. C. Rennie,
Secretary.

J. A. Balkwill,
Chairman.

REPORT OF THE MICROSCOPICAL SECTION OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO

The Microscopical Section of the Entomological Society of Ontario takes pleasure in presenting its thirteenth annual report.

The re-organization meeting was held on the Eighteenth of October, 1902, when the following officers were elected :—

Mr. C. W. Horton.......................... ....Chairman.
Mr. R. W. Rennie ... .Vice Chairman.
Mr. N. Beale..Secretary.

Mr. C. E. Parsons was subsequently elected Secretary in the unavoidable absence of Mr. Beale.

During the past winter (the Microscopical Section resolves into the Botanical Section during the summer months) fourteen regular meetings were held, with an average of ten members, as well as visitors. One of the meetings was given up to the exibition of interesting microscopical objects at a Conversazione of the "Daughters of the Empire." A similar exhibition was made at the annual Conversazione of the Western University at Huron College.

From time to time throughout the season papers were read or addresses given on the following subjects:

The Habits of the Ant Lion and its Larvæ........................ Prof. Dearness.
Pond Life.. ....Rev. C. T. Scott.

Mounting Desmids	Prof. Bowman.
Movements of Protoplasm in Chara	Prof. Bowman.
Structure of Volvox	Prof. Bowman.
Bacteria, their culture and methods of mounting	Dr. Stevenson.
Crystallization of Monobromide of Camphor (shown with a Projection Lantern and Polariscope)	Profs. Bowman and Dearness.

At nearly all the meetings many specimens of interest and beauty were exhibited and discussed, in addition to those which formed the subjects of papers.

All of which is respectfully submitted.

C. E. Parsons,
Secretary.

C. W. Horton,
Chairman.

ANNUAL REPORT OF THE McILWRAITH ORNITHOLOGICAL CLUB.

(The Ornithological Section of the Entomological Society of Ontario.)

In consequence of the early termination of the current year and of other unavoidable circumstances, the Club has held only five meetings since our last Report; the average attendance has been over seven.

The members of the Club offer their thanks to the Society for the permission to change its title to "The McIlwraith Ornithological Club." A letter was received from Dr. K. C. McIlwraith, of Toronto, thanking the Club for this compliment to his father, Mr. Thomas McIlwraith, whose lamented death took place only a few months later. A resolution was placed on the minutes of the Club expressing the regret and sympathy of all its members and a copy was sent to Mr. McIlwraith's family.

The death of Mr. Robert Elliott, which occurred a few weeks before that of Mr. McIlwraith, is a severe loss to the Club. Although not a regular attendant at the meetings, owing to his residence being at some distance from the city, he was always deeply interested in the work of the Club and contributed some able and well written papers to its proceedings. He was probably the best all-round Naturalist in this neighbourhood, being well versed in Ornithology, Botany, Geology and Entomology, and was also without a peer among the local students of Mammalia. The following resolution was adopted by the Club:

"Resolved that we, the McIlwraith Ornithological Club, desire to place on record our sense of the loss sustained by ourselves as a Club and by scientists in Canada as a whole, through the death of our esteemed member Robert Elliott. For most of us he occupied the place of a personal friend and he was an inspiration to us all by reason of his acute observation, his careful notes, and particularly by his accurate and painstaking work on any species or varities that were at all obscure or difficult; and his influence will live long among us, an encouragement and incentive to the best work."

The following papers were read at the meetings: A Red-shouldered Hawk in captivity, Roger Hedley; Nesting of the Hudsonian Chickadee and the Brown Creeper, L. McI. Terrill; My pet Crows, L. H. Smith; Nesting habits of the Cerulean Warbler, W. E. Saunders.

These papers, have, as usual, been sent to the "Ottawa Naturalist" for publication.

Rev. C. T. Scott exhibited photographs illustrating some remarks on his trip from the Georgian Bay by canoe to the Canadian Pacific Railway through lakes and rivers and over portages, returning by the Wahnapitti River.

Mr. James B. Boutellier contributed a long and interesting report on the migrations of birds at Sable Island.

Records of migrations at London were kept and, until the May meeting, were recorded by the Club, 74 migrants having been observed up to May 8th, the date of the last spring meeting.

One meeting was held by invitation at the residence of Dr. MacCallum, Superintendent of the London Asylum; after transacting some formal business, the evening was spent in examining and discussing his large and interesting collections.

A noteworthy feature of the year's observations was the large number of eggs laid by the earliest Hawks, 5 sets of the Red-tailed Hawk, 3 of three eggs each and 2 of four eggs, being shown at the April meeting; less favourable conditions prevailed later on and the Red-shouldered Hawk yielded two sets of only two eggs, the sum total not being above the average.

The Club has been sorry to lose the presence and help of Mr. Harry Gould, one of our most active workers, who has removed to Alberta; some interesting notes are expected of his observations in this new field.

During the year addresses and lectures on Ornithological subjects have been delivered by members to the following audiences: The Literary Society of the Baptist Church, Sarnia; The Baconian Club, London; The Nature Study Class of the Collegiate Institute, Woodstock; The Ladies Literary Club, Woodstock; The Moulton Ladies College, Toronto, and several Societies in London.

On the whole the Club looks back upon a successful year, full of interest, though saddened by the losses mentioned above. We hope that an interesting and valuable share of work will be accomplished before the next report comes to be written.

W. E. SAUNDERS,
Secretary.

REPORT FROM THE ENTOMOLOGICAL SOCIETY OF ONTARIO TO THE ROYAL SOCIETY OF CANADA.

THROUGH THE REV. C. J. S. BETHUNE, D.C.L., DELEGATE.

In giving a report of the doings of the Entomological Society of Ontario for the past year—the thirty-ninth since its foundation—it will not be necessary to recount the various forms of work undertaken by its members, as these were fully described last year and no important changes have since been made in its methods of procedure. It will be sufficient to give some particulars respecting its publications and a brief account of the annual gathering of its members at the head quarters in London.

The *Canadian Entomologist*, the monthly magazine of the Society, is now in its 35th year of publication. The volume for 1902 contains 339 pages, and is illustrated with three full-page plates and twelve figures from original drawings. The contributors number forty seven and represent Canada, the United States, Germany and Russia. The principal articles may be grouped as follows: Descriptions of new genera, species and varieties in lepidoptera by Prof. J. B. Smith, Dr. H. G. Dyar, Mr. Henry Bird, Prof. A. R. Grote, and Mr. A. G. Weeks; Orthoptera by Messrs. E. M. Walker, A. N. Caudell, and J. A. G. Rehn. Hymenoptera by Prof. T. D. A. Cockerell, Messrs. W. H. Ashmead, E. S. G. Titus, Charles Robertson, J. C. Crawford, W. H. Harrington, H. L. Viereck and J. C. Bradley; Hemiptera-Homoptera by Prof. T. D. A. Cockerell, Messrs. E. D. Ball, G. B. King and E. M. Ehrhorn; Neuroptera by Prof. J. G. Needham and Mr. N. Banks; Coleoptera by Prof. H. F. Wickham, and W. D. Pierce. Diptera by Messrs. D. W. Coquillett and C. W. Johnson, and Prof. Cockerell; and Acarina by Mr. N. Banks. Forty-one new genera are described, 176 new species and 12 new varieties and sub-species.

Papers on Classification and Systematic Entomology. Notes on Lepidoptera by Mr. H. H. Lyman, Dr. H. G. Dyar, Professors Grote and J. B. Smith, and on the genus Catocala by Prof. G. H. French; the Wasps of the Super-family Vespoidea by W. H. Ashmead; Ontario

Acrididae by E. M. Walker; Coccidae by Mrs. Fernald; Bombidae by Prof. Cockerell; Halictinae by Mr. C. Robertson; Orthoptera by Mr. J. A. G. Rehn: and an article on the scientific name of the Cherry Fruit fly by Prof. M. V. Slingerland.

Life-histories are given with more or less completeness of the following insects: The Variable Cut-worm (*Mamestra Atlantica*) by Dr. Fletcher and Mr. A. Gibson; *Arctia virgo* and *phalerata* and *Penthina hebesana* by Mr. Gibson; several species of Hydroecia, illustrated by a beautiful coloured plate, by Mr. Henry Bird; *Lycaena Scudderii* by Mr. H. H. Lyman; *Corethra Brakeleyi* by Prof. J. B. Smith; *Lyda fasciata* by Mr. R. F. Pearsall; the egg of the Water-scorpion (Ranatra) by Mr. R. H. Pettit; and the larva of a Datana by Dr. Kunze. Collecting notes, containing observations of much interest, are given by Mr. E. F. Heath on Manitoban Lepidoptera; Mr. W. H. Harrington on Coleoptera; Mr. E. D. Harris on Cicindelidae; Mr. Geo. B. King on Coccidae and the Rev. Dr. Fyles records the capture near Quebec of a Tortoise beetle new to Canada.

Among the miscellaneous papers may be mentioned a discussion on labels for specimens; "What is a genus?" by Mr. H. H. Lyman; "The formation of generic names," by Prof. J. M. Aldrich; "The ecology of Insect Sounds," by Mr. Frank E. Lutz; and an account of the changes in the insect Fauna of northern Illinois by Prof. F. M. Webster.

The thirty-ninth annual meeting of the Society was held in London at the end of October last. Its proceedings were opened by a conference on the Destructive Pea-weevil, which has caused an immense amount of loss in the Province of Ontario during the last few years. The discussion was opened by Dr. Fletcher, who gave a full description of the insect and the ravages it commits, its distribution and the best methods of controlling it; other speakers were Prof. Lochhead, Mr. Pearce, Mr. Fisher and Prof. James, Deputy Minister of Agriculture for Ontario. Resolutions were adopted regarding the diffusion of information among the community, and requesting the Provincial Government to send a competent staff of men to the rural districts of the country whose duty it should be to give the farmers practical lessons on the best methods of eradicating the pest.

Mr. George E. Fisher, the Provincial Inspector of Scale Insects, gave a report on the insects of the year in the Niagara and Hamilton districts, and described his experiments with the lime and sulphur wash for the destruction of the San José Scale, and their successful results.

At a public meeting in the evening the Rev. Dr. Fyles read his presidential address on "Insect Life," illustrated by a series of beautiful coloured diagrams that he had himself prepared; and Prof. Lochhead gave a lantern lecture on "Some Noted Butterfly-hunters and some Common Butterflies."

The proceedings at the several sessions of the meeting and the papers read are given in full in the thirty-third Annual Report of the Society, which was published by the Ontario Department of Agriculture in March last. It consists of 132 pages, illustrated with 108 engravings in the text and photogravure portraits of Mr. E. Baynes Reed, one of the original members of the Society and for many years one of its most active officers, and of Mr. W. E. Saunders, the present energetic Secretary. Reports are given from the various Officers and Sections and the branches at Montreal, Quebec and Toronto, and also from the North-West (Canada) Entomological Society.

Among the papers read may be mentioned the valuable reports on the insects of the year in their districts by the Directors, Messrs. C. H. Young, Ottawa; J. D. Evans, Trenton; E. M. Walker, Toronto; G. E. Fisher, Hamilton and Niagara; and J. A. Balkwill, London. These are supplemented by further notes on the season by Messrs. C. Stevenson, J. A. Moffatt Prof. Lochhead and Dr. James Fletcher. Mr. Lyman contributed a paper on the remarkable habits of the Archippus butterfly, and the points in its history on which further information is required. Dr. Fyles furnished an article on "The Paper-making Wasps of Quebec; Mr. A. Gibson on "Some Interesting Habits of Lepidopterous Larvae," and an account of *Semiophora Youngii*, a new enemy of tamarac and spruce trees; Mr. Harrington, "Notes on Insects Injurious to Pines;" Prof. Lochhead, an illustrated "Key to Orchard Insects;" Mr. Moffat, "A Talk About Entomology;" and Dr. Fletcher and Mr. Harrington the very valuable "Entomological Record for 1902."

REPORT ON INSECTS OF THE YEAR.

Division No. 1.—Ottawa District.—By C. H. Young, Hurdman's Bridge.

The season of 1903, as far as the writer has been able to observe, has not been a very remarkable one as regards insect pests. Some of the well known enemies of the farmer were, it is true, somewhat abundant, but with the exception of about three different pests, I have not detected much serious damage to vegetation of any kind. The season has been an exceptionally damp and cool one, and undoubtedly, this explains the absence on the whole of special outbreaks of injurious insects.

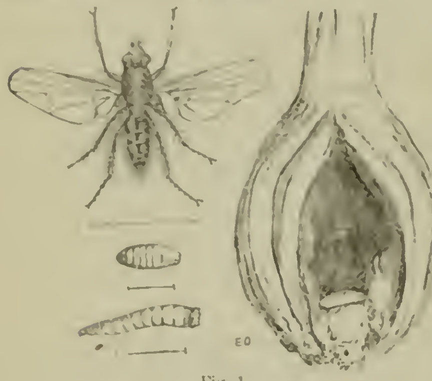

Fig. 1.

Early in the season the Onion Maggot (Fig. 1) was very abundant, and caused considerable damage throughout this district. This insect like all the root maggots is very difficult to treat. A remedy which has given good results particularly in gardens is the sprinkling of the plants directly they appear above ground with a preparation containing some form of Carbolic acid. Dr. Fletcher recommends the following mixture: Take two quarts of soft soap and boil in rain-water until all is dissolved, then turn in one pint of crude carbolic acid. When required for use take one part of this mixture with fifty of water and when well mixed together sprinkle with a watering-can, or spray directly upon the plants.

Cutworms were abundant in May and June and caused serious damage to cabbages and other plants when first put out. The species which was most abundant was the Dark-sided Cutworm of Riley, *Carneades messoria*. The poisoned bran remedy which consists of simply ordinary bran and Paris green in the proportion of 50 lbs. of the former to one of the latter has given splendid results, particularly in gardens. The bran should first be moistened with sweetened water, and the Paris green then added.

The Plum aphis (*Aphis prunifolii*) was the cause of much damage in the Ottawa District. These plant-lice swarmed on the trees in June and serious injury was done in many orchards. The remedy for these insects is to spray the trees when the aphides are first noticed, before they cause the leaves to curl, with whale-oil-soap, 1 lb. in 5 gallons of water, or kerosene emulsion of the usual strength 1 to 9 of water. The Currant saw-fly (*Nematus ribesii*,) was rather more than usually abundant during the past season, and stripped the foliage of many bushes in gardens near Chelsea, Q. and north to Meeck's Lake

On the whole the collecting season must be characterized as poor, owing to the very unfavourable weather.

The month of August, however, was better and during that month, I had very fair results with "sugar." One interesting capture which is worthy of mention is of a specimen of "*Erebus odora*." Many other noctuids were taken, some of which are shown at the meeting to-day.

This collection contains not only many additions to the Ottawa list but also many specimens of species which had been taken rarely before. The most remarkable species of the year's collection is the beautiful little Hairstreak butterfly *Thecla læta*. Other collectors in this district have worked energetically during the season and several good captures have been made. I am glad to notice a growing interest in the good work of rearing species from the egg and making notes on all the preparatory stages.

DIVISION NO. 2—MIDLAND DISTRICT. BY C. E. GRANT, ORILLIA.

I feel rather disappointed that the season of 1903, as well as that of 1902, should have been decidedly off years for the entomologist as, having had the honor of being appointed a Director of the Socety, I should have liked to have made my report interesting. I have taken quite a few species new to my cabinet in the last two years—a great many not named ; some things as *Plusia balluca* and *aereoides* appeared very common this year, usually two or three only being taken in the season. The following notes have been made in reference to noxious insects :

Nematus ribesii. The imported Currant Worm, usually very destructive, No spring brood noticed even on unsprayed bushes and very few appearing in midsummer.

Tremex Columba, (the Pigeon Tremex). This insect is responsible for killing quite a number of fine maple trees in town, though the attack has been probably induced by too heavy and injudicious pruning, causing the bark to split and a certain amount of rot to ensue.

Phorbia ceparum, (Onion Maggott). This insect was noticed to be very common in seed onions.

Doryphora decemlineata, (the Potato Beetle). Early brood scarce, second brood more plentiful. This insect is not allowed to gain headway in this vicinity, Paris Green being freely used.

Oberea maculata, Raspberry Cane-borer), rather abundant amongst cultivated raspberries. The drooping tips of the canes were very noticeable.

Carpocapsa pomonella, (the Codling Moth). This apple pest appears to defy all remedies and weather ; it appears regularly every season and in numbers.

Cut worms have been complained of and most of their moths are appearing plentifully, but *Hadena arctica* and *Leucania unipuncta* are almost rare.

Pieris rapæ, (the Cabbage Butterfly). This insect also seemed to be as scarce as an ordinary *oleracea*. *Protodice* has not been seen for six years.

Bruchus pisorum, (Pea Weevil). On investigation I find that this part of the country is not badly infested with this insect, but I have come across an odd specimen or two in peas grown here.

Clisiocampa Americana, (Tent Caterpillar). Apparently the wet weather in June of the last two years has been too much for this insect as the moths do not show up at light except in isolated specimens.

Eudioptis hyalineata. This insect has been taken by me rather plentifully the last two falls—first taken about five years ago.

Protarparce celeus, (Tomato Hawk-moth). No signs of this pest this year ; moths and caterpillars were numerous in 1901. I had dozens of the moths brought to me at my office suspected of almost any offence in the calendar.

I have taken some nice things in the last two years—*Crambodes talidiformis*, *Cosmia paleacea*, *Ipimorpha pleonectusa*, *Plusia mappa*, and two new Plusias not named, making nineteen varieties of this family taken in Orillia.

Division No. 5—London District. By J. A. Balkwill.

In this district I have not heard of any serious damage from insects that frequently appear in large numbers, but we have had the different species of Aphis in great quantities early in the season on very many kinds of shrubs, causing a considerable injury later on; there was a very perceptible decrease in their number, I have no doubt owing to the destruction of them by the larvæ of the Ladybirds which were observed on many of the plants infested.

The Potato Beetle (*Doryphora decemlineata*) appeared in large numbers as soon as their food plant appeared above ground and caused some damage, but it was generally remarked that in a short time their numbers had become very much decreased from what cause I cannot say, as their destruction by the usual methods of applying Paris Green was not more commonly done than usual.

The Cottony Maple Scale has again appeared in numbers sufficient to cause anxiety among the lovers of our beautiful maple trees, but we are in hopes that its natural enemies will keep it in check as in former visitations.

The Asparagus Beetle (*Crioceris 12-punctata*) appeared in increased numbers in the northern part of the City of London, but has not spread as much as we were told to expect. I have searched for it in the southern part and could not find one beetle on several beds visited.

Complaint was made in one or two cases of tomato plants being bored by some grubs and on examination I found the larva of what I believe to be *Hydrœcia cataphracta*. Only one of the larva was secured and that died before it reached the pupal stage; this is the first time that this has been observed in our neighborhood, so far as we have any record.

Very few peas were grown in this vicinity and were generally sown late so that it is too early for a full report on this crop. In Oxford County I have heard that the crop is badly infested. Would not this be a favourable time to treat all the peas, as the quantity is small and the expense would not be a serious item?

Very few of the apples in this part of the district are damaged by the Codling moth. The cool weather just after the fruit had set would probably account for a diminution in their number. The plums also have not been so much injured by the Curculio, and although bitten by the insect no larva could be found inside a considerable quantity examined from trees where no spraying was done.

The Cigar Case-bearer (*Coleophora Fletcherella*) were very numerous on the leaves of the apple, but the insect being so small the injury was not perceptible.

The presence of the Eye-spotted Bud-moth (*Tmetocera*) could be plainly seen in the orchards by the leaves at the ends of the twigs being dead and drawn together by the web of the insect.

No injury from the Dry Clover-moth (*Asopia costalis*) was found in the barns where it was so abundant the winter before.

In the discussion which followed the reading of the Directors' reports, Prof. Lochhead stated that the 12-spotted Asparagus beetle was very prevalent through the Niagara Peninsula and was travelling gradually westward and northward; at Guelph it was already very abundant. The other species (*Crioceris aspargi*) was causing much damage to the plants in St. Catharines and Hamilton but was not spreading over the country to the same extent. Both kinds will require to be watched and promptly treated wherever they establish themselves. Dr. Howard said that it would be interesting to ascertain whether the Asparagus beetles spread beyond the Upper Austral Belt, the boundary of which extends from Niagara through Hamilton and London to Detroit—Prof. Lochhead in reply said that they had not been found further north than Guelph which is in the Transition Zone just beyond the Upper Austral.

With regard to Cut worms, referred to by Mr. Young, Dr. Bethune stated that they appear to have been very abundant all over the country during the past season. He had received a communication from Mr. Boulter, of Tryon, Prince Edward Island, who complained of the injuries caused by them to turnips and mangels especially, and also to grain crops and potatoes ; in some instances the injury to the young plants was so great that the farmers were compelled to plow them up and put in some other crop. The speaker had recommended the employment of the poisoned bran mixture, which had been used with so much success last year in British Columbia.

The Onion maggot was referred to by several speakers, who reported its prevalence all over the Province, and expressed their gratification that Dr. Fletcher had found an effective remedy in the use of carbolic acid, as described by Mr. Young.

The Codling worm was next discussed. Prof. Lochhead had found that much mischief has been caused by the careless use of burlap bandages. Many fruit-growers were actually cultivating the worm by allowing it to find a secure hiding place for the performance of its transformations beneath the burlap; they seemed to think that all they had to do was to put on the bandages early in the season and leave them to do the work of extermination. If the bandages were not regularly and frequently taken off and the worms and chrysalids destroyed, much more harm than good was done. Some farmers said they were too busy to do this ; if such were the case it would be better not to bandage the trees at all. Others seemed to place entire reliance upon the burlap and give up spraying their trees, with rather disastrous results.

Dr. Howard said that the Codling worm conditions in Ontario were the same as in the north-western states. It had been contended that no success could be achieved there with the remedies that had been found effective in the east. Accordingly the life-history of the insect had been carefully studied in Idaho in order to test this theory. It was found that there were two broods, and that the second brood of worms fed upon the leaves of the trees first and then attacked the fruit. An orchard of 3,000 trees near Boise City had been made use of for a large scale experiment ; the majority of the trees were sprayed first and then bandaged with burlap. In the autumn the crop was examined and it was found that the loss on the trees which had received no treatment was from 70 to 90 per cent. of the fruit, while the trees which had been banded and sprayed yielded from 90 to 98 per cent. of perfect fruit. The effect of this object lesson was that the fruit-growers in that neighbourhood are now enthusiastic about the treatment and are preparing to equip themselves with spraying apparatus for next year. Gasoline power sprayers are being employed in large orchards and are found very satisfactory.

Prof. Lochhead stated that he found two broods of the Codling worm at Guelph. He then gave an account of an experiment at Simcoe, where Mr. Johnson had taken a large neglected orchard, thoroughly pruned and cleaned the trees and then sprayed them three times during the season. The result was that he had a fine crop, ninety per cent. of the fruit being free from worms and scab. In a neighboring orchard where no spraying or other treatment was done, the crop was an almost complete failure and the loss was estimated to reach three thousand dollars.

Papers were then read by Dr. Bethune on "A Menace to the Shade trees of London, Ontario" ; by Mr. H. H. Lyman on "Two remarkable aberrations (Lepidoptera)," who exhibited the specimens referred to ; and by Mr. Stevenson, in the absence of the author, on "Additions to the list of Syrphidæ of Montreal" by Mr. G. Chagnon. The meeting then adjourned.

EVENING SESSION.

A public meeting of the Society, to which the members of the medical profession in Ottawa were specially invited, was held in the hall of the Normal School, on Thursday evening, Sept. 3rd, by kind permission of the Principal. At 8 o'clock the chair was taken by Dr. James Fletcher, who after a few introductory remarks, called upon Professor Lochhead to deliver his address as President of the Society.

PROGRESS OF ECONOMIC ENTOMOLOGY IN ONTARIO.

(*Annual Address of the President.*)

BY WM. LOCHHEAD, B.A., M.S., PROFESSOR OF BIOLOGY, ONTARIO AGRICULTURAL COLLEGE, GUELPH.

MR. CHAIRMAN, LADIES AND GENTLEMEN,—This is not the first time that our Society has held its meetings in your City. This is the fifth occasion, but the fourth was in 1889—14 years ago. We are celebrating our 40th year. If age counts for anything in a Society's history, we should possess a certain amount of wisdom; we are old enough to be wise, yet how many of the people whom we try to help would consider us filled with the spirit of wisdom if they happened to see us, young and old, chasing bugs and butterflies over meadows, and across cultivated fields? In all real scientific investigation there is much apparent senseless (to the superficial, casual observer) but necessary work. The real work is long and often laborious, and done frequently while others sleep.

On occasions of this kind when scientists from Ontario and her sister provinces meet to discuss entomological problems it is the privilege of the President to review the work which has been done not only in Ontario, but also in the larger scientific world outside. It is always well to know what our neighbors are doing in the different fields of scientific research, lest we fall into a rut, become self-satisfied, and make but little progress. I shall not presume to review the progress of Entomology throughout the world, for that would require volumes, but I shall confine my remarks to the much smaller task, viz., the progress of Economic or Applied Entomology in Ontario.

There are gentlemen in this Society who are more capable than I of bringing before you the progress of Economic Entomology in Ontario. I refer to gentlemen like Dr. Bethune, Dr. Saunders and Dr. Fletcher, who have served this Society faithfully; who have ever kept themselves in the foreground where the hardest hits are received and given; who have experimented and toiled that the husbandman might have greater returns; and whose achievements are the records of the progress which I am about to record.

When we consider the status of applied Entomology to-day, and contrast it with that of a generation ago, we cannot help being impressed with the magnificent strides that have taken place. To-day Economic Entomology has a place among the other applied sciences, and the farmer, gardener, and fruit-grower appeal to the economic entomologist with confidence in the results. To-day Entomology is being taught in many of our schools, not perhaps as a systematic science, but as a most valuable Nature-Study; and the life-histories of many of the most common insects are being worked out every year by hundreds of eager, enthusiastic nature-students. To-day chairs of Entomology are established in our larger universities, and corps of trained entomologists are maintained by the most advanced governments of the time.

This change has not taken place all at once, as if by magic, but by slow, almost imperceptible, degrees. Entomology possesses no magic wand to command the attention of the workers of the soil and the cultivators of the crops of the soil, who are by nature not given to a hasty adoption of new-fangled ideas. By patient, pains-taking work the student of insects has gained the ear of the government and the people. Credit will never be given to the thousands of modest workers who worked for the love of investigating, and who did not look for the applause of the public. In the pages of annual reports, in magazines, in agricultural papers, and in the unpublished note-books in some obscure office, will be found the results of the work of the noble band of workers. Our own Canadian band did much to hasten the time when the people would recognise the work of entomologists by listening gladly to their words of advice in times of stress. Not only did our Canadian workers add to our knowledge by the publication of original observations, but they also kept close watch over the work of the entomologists across the line in the United States, and were able to take advantage of any good remedial treatment as soon as the announcement was made in the United States. Our older observers kept in close touch with the best observers in the United States, by personal correspondence about the insects of their respective districts.

When one attempts to give the history of Economic Entomology of Ontario he is disposed to divide the time into Epochs. The first Epoch we may term the *Primary Epoch*, inasmuch as the first settlers were but little troubled with insect pests; the country was but sparsely settled ; and no notice was taken of the toll levied by the insect marauders, if there were any. This Epoch extended from the first settlement of the Province up to 1850.

The second Epoch may be called the *Secondary Epoch*. The sons of the early settlers had now control of the best farms of the Province ; another lot of settlers was pouring in from the Old Land to occupy the newly-surveyed townships, and the farmers of the older districts for the first time felt the attacks of injurious insects. It was the Epoch when the Wheat Midge, the Hessian Fly, and the Pea-Weevil caused almost wide-spread destruction of the farm crops. It was the Epoch when the Legislature of the day was compelled to take cognizance of Entomology, and to offer prizes for the best written Essays containing the best remedial treatment against these insects. Too little was known as to the life-histories of insects in general, and of these pests in particular, to expect much from these pioneers in applied entomology ; but the importance of this governmental encouragement was that attention was strongly drawn to the fact that there were remedies against insect pests as there were against the ailments of man and beast. Entomological workers were encouraged to continue their work, for they saw official recognition of their best labors. As a result of this we have no doubt the founding of the Entomological Society of Ontario in 1863 by a small band of devoted and enthusiastic young men who had faith in the future. We have but two or three members of this first lot left, but we admire them for the amount of work which they have done, for the way they have gradually won the recognition of the Legislature and the people. This Epoch extends from 1850 to 1875.

The third Epoch may be called the *Tertiary Epoch* of the Entomological history of the Province. The chief characteristic of this Epoch is the introduction of remedial measures founded upon a fairly complete knowledge of the insect pests of the farm, orchard and garden. The early seventies saw the gradual introduction of Paris Green as a poison for mandibulate or biting insects, but it required many years of patient experimentation to determine the best proportions to use, and the best methods of applying the substances to the insect and the plant. Later, London Purple was tried as a substitute, but it has not held its own with Paris Green, from the fact that its composition was liable to considerable variation in the amount of soluble arsenic.

This Epoch saw also the introduction of kerosene emulsion against sucking insects, and Bordeaux mixture to control fungous diseases.

Coincident with the adoption of these new insecticides was the development of machinery and apparatus for the application of the insecticides. The history of spraying machinery forms a very interesting chapter in Economic Entomology, but I shall not deal with it here. Suffice it to say that the success of the investigations of to-day may be largely attributed to the excellent appliances which are at our disposal.

This was the Epoch of experimentation along scientific lines, for the studies of the previous Epoch had made us ready for such work.

This Epoch extends from 1875 to 1900, and we have now entered upon another, which may be termed the *Quaternary*. It is hard to surmise what the future has in store for us in the way of improvements in applied entomology, but I feel that if scientific entomology works hand in hand with chemistry and physiology, many surprises are in store for us. I feel that something will be done towards a simplification of the common formulæ now in general use.

Economic Entomology, then, as far as Ontario is concerned, dates from the early seventies, although considerable had been written earlier by Professor Hind and Dr. C. J. S. Bethune, the latter as editor of the entomological column of *The Canada Farmer* from 1865 to 1873. I am sure that Dr. Bethune himself will acknowledge that the information at that time regarding remedial treatment was not very extensive. It is true that our fathers and mothers at times practised according to the very latest methods, and that they had some knowledge of the value of the soaps and lye as insecticides. The series of Annual Reports issued by the Entomological Society beginning with 1870 were most admirable, and probably did more to familiarize the people with the names and habits of the common insects of the orchard and garden than any other cause. When one travels about the country, as I have sometimes occasion to do, on insect quest, one is often surprised at the amount of knowledge displayed by the older men. These men had read the early Reports, and had inwardly digested them.

When Dr. C. V. Riley was preparing his famous Missouri Reports, our entomologists furnished him much information and material, for their names are frequently mentioned by him. Among the workers at this time were: Dr. Wm. Saunders, of London; Dr. Bethune, of Port Hope; R. V. Rogers, of Kingston; E. Baynes Reed, of London; and B. Gott, of Arkona.

A little later, Dr. Fletcher and Mr. Harrington, of Ottawa, J. A. Moffat, J. D. Evans and Dr. Fyles joined the Society, and soon took a prominent part in its proceedings.

When the Experimental Farm was established at Ottawa, Dr. Fletcher was made Dominion Entomologist. His annual reports have always contained the very latest information as to the best remedial treatment for the noxious insects of the farm, garden and orchard. Through his labors, our knowledge of insect life has been greatly widened. His pen is facile and his tongue is both fluent and eloquent. For the last 15 years, Dr. Fletcher has been the chief entomological figure in Canada, and his reports are eagerly scanned by our brother workers across the line. Long may he be spared to occupy the important position he now holds!

Indirectly for many years, Professor Panton was performing a very important work at the Ontario Agricultural College by training a younger generation of observers in the ways of insect life. His was a busy life among his students, and it is a great regret that he could not find more time to attend the annual meetings of this Society of which he was a member.

During the eighties and early nineties, the values of the chief insecticides were determined. With the adoption of better methods of farming and the rotation of crops, it was possible, in many cases, to control the attacks of injurious insects. The knowledge of insect life became more general through the efforts of men like Dr. Fletcher, Dr. Saunders, Dr. Bethune, the annual reports of both Dominion and Province and the many speakers attending the Farmers' Institutes, of which Prof. Panton was chief entomological speaker.

Among the chief insect pests of the Province in late years were: the Hessian Fly, the Army Worm, the Wheat Midge, the Pea-Weevil, the Horn Fly, Cutworms, Wireworms, the Cabbage and Onion Maggots, the Codling Moth, the Clover-Seed Midge, the Tent Caterpillars, the Potato Beetle, Apple Aphis, the San Jose Scale and the Tussock Moth. For all of these remedies have been determined, so that the intelligent, wide-awake farmer and fruit grower need have no difficulty in controlling them. It would be difficult to estimate the money thus saved to the Province every year by the adoption of the remedies advocated by the entomologists, members of this Society.

While the main efforts of our members have been given to the perfection of remedial measures, which, I am proud to say, have been adopted by the best farmers and fruit-growers, I surmise that considerable attention will have to be given to the work of educating the rank and file, if the country is to get the full advantage of our work. I feel that we must enter upon an educational campaign. I do not imply that we must not remain investigators as in the past, but we must take every opportunity to write and speak about our work. When we realize that fully ten per cent. of the produce of the farms are destroyed by insects, we have some idea of the importance of our mission. We need not only more investigators, but also more propagandists and expounders.

A great opportunity is open to us in furthering the new educational idea of Nature-Study. It is now fairly well recognized that insect life forms one of the best subjects for Nature-Study. Let us help along the good work, for by so doing we are hastening the time when all will know the facts which we have patiently determined. I am a firm believer in the doctrine that, whenever possible, those forms should be studied, which are of importance economically.

It is pleasing to learn that the Annual Reports of our Society are appreciated as fully on the other side of the line as they are at home. Listen to what the President of the Association of Economic Entomologists said in his Presidential Address read in Washington not one year ago. Dr. Felt said: "The reports of the Entomological Society of Ontario, beginning in 1870 and extending to date, are a remarkable series of publications, replete with interesting and valuable observations by many writers upon the economic insects of that section. These reports, and those from 1884 to date, of Dr. James Fletcher, entomologist and botanist of the Dominion Experimental Farms, include most of our records concerning the insects of the northern part of America, and are composed largely of original observations and exceedingly practical recommendations and deductions from observed facts." (Proceedings of the Fifteenth Annual meeting of the Association of Economic Entomologists, page 13).

The three epoch-making works on Economic Entomology in America have been Harris's "Insects Injurious to Vegetation;" Riley's "Missouri Reports"; and Saunders' "Insects Injurious to Fruits." Of these, Saunders' work is by far the best-thumbed book at the present time. Although first published in 1883 the observations recorded in that book are still remarkably accurate, and but slight revision would be necessary to bring the descriptions well up-to-date.

In any review of the work done in Entomology mention should be made of the most notable publications of the year. Two very valuable books have appeared, which should be found of great service to the systematic, and indirectly also to the economic entomologist. Early in the year Dr. Harrison G. Dyar, of the United States National Museum, distributed his "List of North American Lepidoptera and Key to the Literature of this Order of Insects." It appears as Bulletin No. 52 of the U. S. National Museum. On account of the activity of many workers in Lepidoptera in recent years it had become almost impossible for the ordinary worker, away from the great museums and collections, to keep himself informed of the large number of new species which were being described in the various entomological publications. This Bulletin of Dr. Dyar's will be welcomed by hundreds of lepidopterists in the United States and Canada.

The other publication is "A Catalogue of the Coccidae of the World," compiled by Mrs. M. E. Fernald, the talented wife of Professor C. H. Fernald, of Amherst, Massachusetts. In these latter days when a knowledge of Scale insects is of such great importance to the economic entomologist this Catalogue comes as a "a long-felt want," and will be one of the most valuable books of reference on the shelves of the working entomologist. It will now be possible for the Coccidologist to complete his library with the necessary literature bearing on the scales with which he has to work.

I am sure that I voice the feelings of all our members when I say that we are all very grateful for the generosity of the Department of Agriculture at Washington, for its valuable publications, and we admire the activity of that Department along all lines of science related to agriculture. We are indebted especially to the Division of Entomology, of which Dr. L. O. Howard is Chief, for generous and timely supplies of their most valuable Bulletins. Would that our Dominion could see its way clear to enlarge our working force !

It is the duty of the members of this Society not only to determine and announce the best remedies for the troubles produced by injurious insects but also to denounce in strong terms the introduction of "fake" remedies, which occasionally come to our notice. Perhaps the most flagrant piece of imposition of the year was a "Process to protect Fruit Trees, etc., against Injury from Insect and Fungus Pests." This Process (according to the circular) consists in administering into the growing tree certain ingredients, in a particular manner, which the inventor has proved to be effective for the purpose above mentioned. It protects the trees and fruit against damage by borers, codling moths, caterpillars, San Jose Scale, black-knot, leaf-curl, yellows, scab, and other insect, parasite and fungus enemies to trees !

This is a wonderful remedy (according to the discoverer), but I regret to state that in those orchards where I have seen it tried the results have been far from satisfactory. The codling worm was there ; the borers were there ; the San Jose Scale was there ; everything in fact except favorable results. A great many fruit-growers appeared willing to give the "Process" a trial at a cost of 25 cents for every tree "plugged." The ingredients put into the hole in the tree were it is believed, charcoal and sulphur, both insoluble in water, and in the sap of the tree. Our knowledge of the movement of fluids within a tree is not sufficiently accurate to be able to state definitely what becomes of the various solutions which enter by the root, but we do know that charcoal and sulphur placed in a hole in the trunk of a tree will not affect the insect and fungus pests. One sometimes forgets that the circulatory system of plants is of the diffuse character, unlike that of the higher animals which have a definite enclosed system of tubes. We sometimes talk of the *upward* current and the *downward* current as if they flowed in well-defined channels, but the idea is not strictly correct. We should liken the currents of sap rather to a great river in times of flood, when its waters are flowing irregularly over the banks, and at the same time flowing strongly in the main channel.

Again, it is more than probable that any poison introduced into the plant would kill the cells into which it entered, and therefore kill the plant. It is very doubtful also if the cells of an active living plant would absorb substances in solution which would prove hurtful. Protoplasm has the power of regulating the entrance of substances which pass through it into the vacuoles of the cell. So long, however, as any part of the plant is a mystery, so long will so-called discoverers inflict their *nostrums* upon the unsuspecting public. To think also that this process emanated from the Mecca of entomology, London !

THE TRANSMISSION OF YELLOW FEVER BY MOSQUITOES.

By Dr. L. O. Howard, United States Entomologist.

The following is an abstract of Dr. Howard's able and most interesting address which was listened to by those present with the utmost attention.

The speaker began by mentioning some of the severe outbreaks of Yellow Fever which are especially memorable. Throughout the West Indies they have been frequent virtually since the discovery of America. In the United States there were outbreaks as far north as Boston in 1692 ; a century later there was a terrible epidemic in Philadelphia; in 1853, 1878, and 1889 the disease raged in several of the Southern States and carried off thousands of victims. In consequence of this liability to outbreaks of the fever, these States were greatly hindered in their development and much injury was thus indirectly done to their interests and progress. Any remedy therefore which could be effectively prescribed for this plague was of immense importance to that whole region of country as well as to all the islands of the West Indies and some parts of the Spanish Main.

It was a source of great gratification and thankfulness that the remedy had at last been found, and that there need be no further fear of an epidemic of Yellow Fever in the future. It had been proved beyond doubt that this fell disease was only transmitted by a mosquito, and that by warding off the attacks of the insect it could be kept under complete control. There is now no further need of costly and vexatious quarantine arrangements ; cargoes of perishable fruits from suspected ports will no longer be detained while the fruit is rotting, and commerce in those southern seas will be freed from the restrictions formerly imposed upon it.

Dr. Howard then related the various onward steps which had been taken in order that the important discovery might be verified and all doubts as to its truth be removed. For a long time it was supposed that the fever was either carried by the air or conveyed in clothing or other articles which had come in contact with one suffering from the disease. When at length science had discovered that micro-organisms were the cause of many infectious diseases, the search for the yellow fever baccillus was soon undertaken and many investigators laid claim to its discovery. Dr. Sanarelli, in 1897, published an account of a germ that he named *Bacillus icteroides* and which he believed to be the true cause of the fever. As this was subsequently reported to have been discovered by two surgeons of the U.S. Marine Hospital Service in thirteen out of fourteen cases of yellow fever in Havana, it was then by some accepted as the obnoxious bacillus.

The next stage in the investigation was the mode of transmission of the noxious organism from the sick to the well which caused the wide and rapid spread of the disease. Dr. Carlos Finlay, of Havana, was the first to put forth the theory that a mosquito was the agent, and in 1881, he stated his belief that this insect was the species known as *Culex* now *Stegomyia*) *fasciata*. He failed, however, to prove the absolute correctness of his theory as the experiments he made were not entirely under his control and there was in consequence great room for doubt. It was not until so recent a date as the year 1900 that a full and convincing demonstration was made of the truth of this theory. An official board of United States Army surgeons under the leadership of Dr. Walter Reed, of the United States Army, was appointed to investigate the infectious diseases prevailing in Cuba, and they arrived at Quemado on June 25th, 1900. One of their first proceedings was to make experiments with Dr. Finlay's mosquito. Eleven persons allowed themselves to be bitten by contaminated mosquitoes. In two cases only did yellow fever result ; one of these was Dr. Lazar, a member of the board, who died in consequence and thus laid down his life as a noble martyr to the cause of scientific work for the benefit of suffering humanity.

In the November following the board resumed its work and built two experiment houses a mile from the town of Quemado. In one of these, volunteers allowed themselves to be bitten by infected mosquitoes,and in the other volunteers,quite as brave,submitted to live and sleep in badly ventilated rooms with soiled bedding and clothing brought directly from yellow fever patients in the hospitals. Both cottages were screened to prevent the ingress of any mosquitoes from outside. The result of the experiments was that out of thirteen of those bitten by infected mosquitoes, ten contracted the disease, while the volunteers who spent many nights in contact with infected clothing entirely escaped. The utmost care was taken to preclude any possibility of mistake, and the results have been accepted by medical investigators who visited the station as absolutely conclusive.

Dr. Howard paid a high tribute to these men who so bravely risked the loss of their lives by a loathsome disease without any prospect of pecuniary reward, in order that by doing so they might help to save thousands of their fellow-creatures in the future from disease and death. Courage such as this, exhibited by American soldiers and hospital attendants, should rank as high in the annals of heroism as the bravest deeds done on the battle field or in stress of storm or fight at sea.

After having established the fact of the transmission of the disease through the agency of mosquitoes further investigations were carried on by the members of the commission in order to discover if possible, the micro organism which caused it. Repeated experiments revealed that the disease could be conveyed not only by the bite of the mosquito but also by the injection of the blood serum of a yellow fever patient into the system of one who was not previously immune to the infection. And this blood serum it was found could actually be filtered through porcelain and yet still retain its power to convey the disease. On being submitted to various degrees of heat, it was discovered that the serum lost its toxicity at a comparatively low temperature, one too low to have effect upon any known toxin. It seems, therefore, to be conclusively established that the cause of yellow-fever is a micro-organism in the blood which it is beyond the power of the microscope to detect.

These experiments satisfactory as they were, did not entirely convince the physicians of the south, and accordingly other and independent investigations were made. In 1901 the Havana Board of Health caused a series of experiments to be carried on at Las Animas Hospital under Dr. Guiteras, a well known yellow-fever expert, and Dr. J. W. Ross the director of the hospital. In a number of cases the disease was conveyed by the bites of infected mosquitoes and several of the patients unhappily lost their lives, while those who submitted to contact with infected clothing and at the same time were protected from mosquito bites, came out of the ordeal in good health and perfectly free from the disease. These experiments were conducted with the utmost care in order to preclude any doubt as to the certainity of their results. They entirely corroborated the conclusions drawn by Dr. Reed from his investigations of the previous year.

Later on further experiments of a most careful kind were conducted at Sao Paulo, Brazil, by Dr. Lutz, director of the Bacteriological Institution of that province. In this case mosquitoes were brought from uninfected places at a distance, allowed to bite a yellow fever patient, and then conveyed to another uninfected region some hundreds of miles away; there they were allowed to bite non-immunes who had been for some time quarantined and who voluntarily submitted to be experimented upon. Out of six cases three contracted the disease, and all happily recovered. The effect on public opinion of this experiment was very great, and all opposition to the adoption of practical measures for the extermination of mosquitoes was soon abandoned.

If further proof of the reality and importance of this discovery were needed, it may be found in the fact that now the City of Havana is free, and has been so for many months, from the plague of yellow fever—for the first time probably in its history. That this immunity is not due to other causes is evident from the fact that although the city was thoroughly cleansed and effective sanitary measures were put in operation during the American administration and under the Cuban Board of Health, yellow fever still prevailed while the general health in other respects was vastly improved. When, however, the extermination of mosquitoes was undertaken, their breeding places destroyed, and all yellow fever patients protected from the bites of these insects, the dissemination of the disease was at once checked and no fresh cases occurred. This was indeed a great scientific triumph—one that has brought immense blessings in its train, and which has opened the way to future achievements for the benefit of mankind in various regions of medical investigation.

Dr Howard gave a description of the mosquito, *Stegomyia fasciata*, and stated that it was in the habit of biting in the day time as well as at night; that it was essentially a house insect, breeding in water tanks and barrels, in the roof troughs, and anywhere where standing water was to be found; it was not usually met with in the woods, but was very abundant in cities and towns. Its thorax, abdomen and legs are banded with white, and hence it is named *fasciata*, the striped mosquito, (Fig 2); the larva resembles that of other mosquitoes, and being a true air-breather is easily destroyed by a film of kerosene oil on the surface of the water that it inhabits; the eggs (Fig. 3) are laid singly in standing water. This species is tropical or subtropical in its range, being only found between the latitudes of 38° north and south and at low altitudes; throughout this region it is necessary that any person affected with the fever should be absolutely protected from the mosquitoes, as by this means the spread of the disease will be prevented. No other form of quarantine is necessary; no one is liable to contract the disease unless he is bitten by a mosquito which has previously bitten a yellow fever patient.

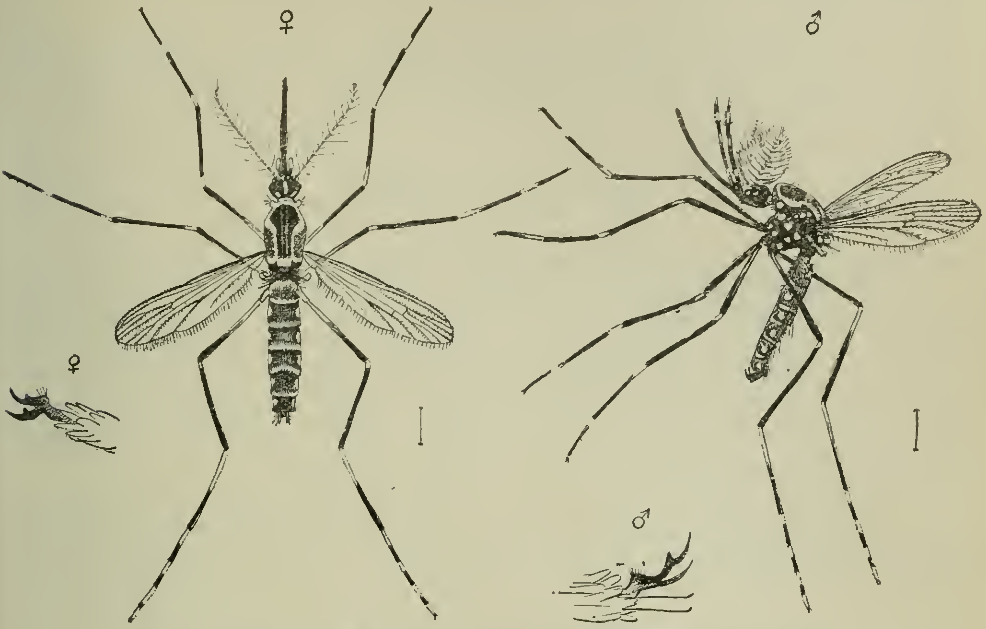

Fig. 2. The Yellow-fever Mosquito. (*Culex* [*Stegomyia fasciata*] *æniatus* or *fasciatus*.)*

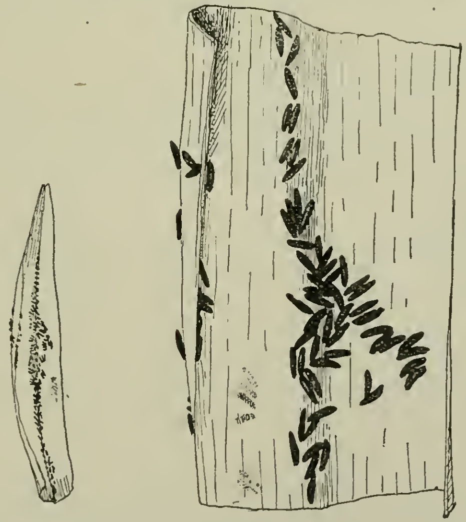

Fig. 3. Eggs of Yellow-fever Mosquito in natural position on Grass-stems.*

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* These illustrations are given by kind permission of The Century Co., New York.

This discovery Dr. Howard regards as one of the greatest in these opening years of the 20th century, and he thinks that we are on the eve of a great revolution in medical science which will result in the prolongation of the lives of future generations when the true causes of fatal diseases have become known.

A series of questions on various points were then asked, to which Dr. Howard very kindly and fully replied. A hearty vote of thanks was moved and seconded and very cordially adopted by the audience.

SECOND DAY'S SESSION.

FRIDAY, SEPTEMBER 4th, 1903.

The Entomological Society resumed its meetings at 9.30 o'clock, a.m., the President, Prof. Lochhead, occupying the chair. His own paper on "Insects of the Year," was the first upon the list; he was followed by Dr. Fletcher, who spoke on the "Insects of the Season in Ontario," and by Dr. Howard who gave an address on "Recent Work in American Entomology." These papers were listened to with great interest and were followed by animated discussions in which most of those present took part. Dr. Fletcher and Mr. Gibson exhibited many specimens in illustration of the insects which had been specially injurious in Ontario.

In the afternoon the Society met at 2.30 o'clock and at once proceeded to the election of officers for the ensuing year, which resulted as shewn on page 4. Papers were then read by Mr. Gibson, Mr. Lyman, Mr. Stevenson, Dr. Fletcher, Mr. Winn and Dr. Bethune, and were in many cases fully discussed. The majority of these papers are published in the following pages, but a few, being of a technical character, will appear in the "Canadian Entomologist," the monthly organ of the Society; among the latter may be mentioned papers by Mr. Lyman on "Two remarkable aberrations (Lepidoptera)," by Dr. Fletcher on "Life-histories of *Apocheima Rachelae* and *Leucobrephos Middendorfii*," and by Mr. Gibson on "The larvae of Canadian Tiger Moths of the genus *Apantesis*."

Votes of thanks were heartily passed to the Ottawa Board of Trade for the use of their room during the meetings; to the Principal of the Normal School for the use of the Assembly Hall on Thursday evening; to the newspaper press of the City of Ottawa for their notices and reports of the proceedings.

Mr. Williams, on behalf of the Toronto Branch, invited the Society to hold its annual meeting in 1905 in Toronto, and assured the members that they would receive a hearty welcome. He urged also that it would help and encourage the Branch very much and be of great benefit to it and to the Society at large. After some discussion of the matter, Mr. Williams was thanked very much for the invitation and it was decided to defer action until next year.

A cordial vote of thanks was given to Dr. Howard "for his kindness in attending the meeting, and for his valuable addresses which contributed so much to the success and interest of the meeting."

On Saturday morning a visit was made to the Division of Entomology at the Central Experimental Farm, where some time was spent in examining the collections under the guidance of Dr. Fletcher and his assistants, Messrs. Guignard and Gibson. At 12 o'clock the visitors were driven about the Farm and shewn the chief objects of interest and at one o'clock were entertained by Miss Dorothy Fletcher to an *al fresco* lunch in the Botanical Garden. The afternoon was spent, with nets and collecting apparatus, in an excursion to Dow's Swamp and the Rideau River; the weather was not very favourable for securing specimens but the outing was nevertheless much enjoyed, and the kindness and hospitality of Dr. Fletcher and his daughter were highly appreciated by all who had the good fortune to be there.

The following exhibits were shown by those attending the meeting :

By Dr. James Fletcher : *Apocheima Rachelae* in all stages from the egg to the perfect nsect, with inflated larvae ; *Leucobrephos Middendorfii*, in all stages ; *Chionobas Alberta* without any ocelli above or below ; *Gynaephora Rossii*, bred by Mr. Percy B. Gregson, from larvae found at Blackfalds Alta., also mature larvae collected this year at the same place. The type specimen of *Catocala unijuga*, var. *Fletcheri*, Beutenmueller.

By Mr. Arthur Gibson : A complete collection of the Arctian moths of the genus Apantesis so far recorded from Canada, and referred to in his recent paper. Also a collection of about fifty inflated larvae of lepidoptera.

By Dr. Bethune : The remarkable beetle found by Mrs. Slosson in New York (Can. Ent. XXXV, page 183, July 1903) which has not yet been identified.

By Dr. C. H. Young : A fine collection of inflated larvae taken during the season, or reared from the egg—all local (Ottawa) species. About fifty noctuidae taken at Ottawa many of them not previously recorded from that district. Also a fine female specimen of *Erebus odora* taken at sugar.

By Mr. Lyman : The remarkable aberrant forms of two moths, referred to in his paper.

By Mr. J. D. Evans · A box of moths taken at Trenton including among other rarities *Apatelodes angelica*.

By Mr. A. E. Norris, Montreal : Box of moths including *Cossus centerensis*, *Hydraecia rutila*, *stramentosa*, *marginidens*, *purpurifascia*, *cerussata*, and *Cressonia juglandis*.

Specimens were also exhibited by Mr. Stevenson and Mr. A. F. Winn, of Montreal, and Mr. J. B. Williams, of Toronto In addition to these there was exhibited a specimen of a Blue Lizard, the only species taken in Canada.

INSECTS OF THE SEASON.

By W. Lochhead, Professor of Biology, Ontario Agricultural College, Guelph.

From my own observations and from reports obtained from most sections of the Province, it is evident that the injuries done by insects this year have been below normal. The causes which lead to the decrease or increase in the number of injurious insects for any particular season are not well determined. We still require to make many observations and to make more thorough search into insect life at all stages of the year before much head-way can be made in determining the causes. We must note, however, that the seasons of 1902 and 1903 were both cold and wet, and when we bear in mind that this combination of conditions is very harmful to larval life it is probable that some of the causes for the dearth of insect life during these seasons have been determined. As in my previous reports I shall deal with the injurious insects according their host plant.

Cereal Crops.

Hessian Fly. Cereal crops have not been disturbed much by insect life. The Hessian Fly scourge which did so much damage in 1900 was not evident, and in most localities was almost entirely absent. This happy condition of things is due to the action of the farmers themselves in accepting the advice of the entomologists who had studied this question quite thoroughly. The farmers had got into the habit of planting their fall wheat too early. In some of the central counties in the south-western part wheat was sown as early as the 20th of August. Experience soon convinced them that the entomologists were right, and that they were working in league with the Hessian Fly by planting their wheat at that date. Late planting is now the rule in most sections, and from all reports the crops are just as heavy as if they had been sown two or three weeks earlier.

Wheat Midge. In early spring there was a fear lest the Wheat Stem maggot would become destructive this season, for many fields showed evidence of being badly infested. Through some cause or other the pest did not make headway, and it is probable that very little damage was done.

PEA CROPS.

Pea Weevil. Judging from the returns of the Bureau of Industries the farmers of the Province took the timely warning and are giving up to some extent at least the growing of peas, and substituting other crops, in some cases Grass Peas, in others Emmer, and so on This was the advice given in the bulletin issued by the Department of Agriculture, Toronto, early in the year It was felt that although fumigation with carbon bisulphide was a good remedy, but few of the farmers would take the trouble to fumigate their peas immediately after harvest. In some sections the growing of peas has been discontinued entirely, and it will not be long before their growing can be resumed. In the newer sections where pea growing is still a profitable industry the fumigation treatment is highly recommended, but in the older sections where the crop has been a failure for the past few years it is as strongly recommended that the growing of peas be given up entirely for two years at least. This summer I had an opportunity to make a few observations regarding the deposition of the eggs of the pea weevil. They are, as you probably know, spindle-shaped and of a golden color, and are deposited on the outside of the pod. It is the general impression that the eggs are deposited in the pods while the pods are very small, in fact when the blossoms are still to be found I found this season fresh eggs deposited on pods two and three inches long and the peas within afterwards became thoroughly weevily. It is my strong impression that the beetle continues to lay eggs for a longer period than is suspected, and that is the reason why the late crops suffer almost as much as the early crops.

ROOT CROPS.

Beet Leaf Miner. Up to date of writing the root crops have been singularly free from injurious insects. The introduction of large areas of sugar beets has brought into prominence the pest which may give considerable trouble in future years. This is the Beet Leaf Miner (*Pegomya vicina*). About the 20th June the sugar beets in many sections were badly infested with this leaf-miner and the indication at that time pointed to considerable loss of the beet crop. Strangely, however, the damage did not prove to be very serious, and but little complaint was heard in later months. The adult of these leaf-miners is a two winged fly. This pest is not a new one for we have been made acquainted with its habits through the writings of the entomologists of the United States. According to their observations the eggs are placed on the under side of the leaf, usually singly, and the maggot enters the leaf immediately on hatching. There may be many broods during the season. When the maggot becomes full grown it leaves the leaf and changes to pupa either on the leaf or in the surface of the ground. It is probable that it hibernates as pupæ from which the flies emerge in April or May. It has been observed that it is preyed upon by a bug which often keeps it in check. In spite of all that has been done no successful attempt has been made to destroy the pest. The following methods have suggested themselves and have been tried with but partial success; first, deep plowing, and rolling the infested fields in the fall to bury the pupa deep so that the flies cannot emerge; and weeds of the species of Lamb's Quarters should be destroyed in as much as the insect also feeds on this plant. Where these weeds are abundant the pest is also likely to spread to the beets

ORCHARD INSECTS.

Codling Moth. Recent observations lead me to think that the Codling worm was quite destructive this summer. The effects of the first brood were not very evident, but those of the second are becoming quite in evidence. As in previous years there is no better method of dealing with this pest than to spray thoroughly with Bordeaux Mixture and Paris Green and to bandage the trees with burlap before the second week in June and to examine the bandages every two weeks during July and August for cocoons of Codling Moth.

Plum Curculio. The plum curculio although abundant this year has not been felt much on account of the tremendous supply of plums through the country. It simply thinned out the crop and did very little damage. There has always been considerable discussion as to the best method of dealing with the plums in ordinary seasons. Some orchard men prefer jarring the trees, while others place considerable faith in an application of Paris Green. There seems to be some reason for the belief that there is a time in the history of the curculio when it is more readily killed than at other times. One observer reported to me that he always had good results in spraying curculio with Paris Green before the incision had healed. He believed that if he could apply Paris Green in the incision before it healed over, that the young grub would get a poisonous meal when hatched.

A Cherry Fruit Fly. W. E. Gammage, Oshawa, reports the loss of all his fruit from some English Morello cherries. The cherries began some time ago to rot, and when I examined specimens of the injured fruit I found a maggot within each. These maggots I believe to be the cherry fruit-fly which was quite destructive a year or so ago in New York State. I received some of the infested cherries from Mr. Gammage on Aug. 21st and found them infested with the maggot. Prof. Slingerland in BULLETIN 172, Cornell Agricultural Experiment Station says, "We have found young maggots as late as August 16th." The maggots which I found in these Morello cherries were light yellowish white in color, and near the head were two slight projections. These peculiarities corresponded with the description given of this pest by Prof. Slingerland. According to him the maggots hatch from eggs laid by a pretty little fly as small as the common house fly. Their wings are crossed by four blackish bands, and have also in addition a blackish tip. The maggot confines itself to a single cherry and lives within it during its whole life which may last three or more weeks. Many of the maggots would be full grown when the fruit would be ripe. They change to pupæ on the ground or at the bottom of baskets and rubbish. There seems to be but one brood per season and most of this is passed as pupa. In England where the pest is better known remedial treatment has not been entirely successful. Spraying seems to be out of the question for before it can pass beneath the skin the maggot is within the fruit, and the pupa is within the ground. Undoubtedly much can be done to check this pest if the infested fruit were picked up and burned before the maggots turned into pupæ, but this is hardly practicable, unless the whole crop were picked and burned before the maggots became mature. Cultivation has been tried in Australia in the hope that the pupæ might suffer by the process of cultivation, but their results were not satisfactory. Much can be done to keep this in subjection by allowing hens free access to the cherry orchard, especially if the ground were stirred up occasionally so that the pupa might be more readily exposed to the poultry.

Pear Tree Psylla. This insect has been very injurious this past season, more especially in the Grimsby district. A correspondent writes this regarding it: "When I came home on July 4th, many trees were fairly covered with it. The insects were mostly wingless forms with a few winged forms. (Figs. 4 and 5.) They are found in the axis of the leaves, along the petiole and along the blade, but chiefly found on the leaves a short distance from the vein or just in the axis of the secondary veins or mid-vein. In the first place, the tissue of the leaves dries up in spots where they are situated, but in the latter case they cause a drying of the tissue along the edge of leaf. When the Psylla is situated in the 'outer axis of the leaf, the petiole seems yellowish in color and the attachment to the stem seems weak. About

ig. 4. Pear-tree Psylla; adult winged female, greatly enlarged. (After U.S. Dept. of Agriculture)

July 15 to 25, the Psylla were most abundant the number of winged forms increasing until the 25th. A heavy rain on the 23rd cleared the trees of the sap and seemingly quite a number of the Psylla. After another heavy rain on the night of July 27th, I noticed that there were very few of the wingless forms but a great number of the winged ones. Up to this time very few leaves had fallen off, although the growth of the trees was completely stopped, in fact, our trees have apparently made no growth at all this year excepting a few that were free from the Psylla. Where there was growth, it was from two to four feet. At the time of writing, August 27th, the wingless forms have again become numerous and the winged ones few." (W. R. Dewar.)

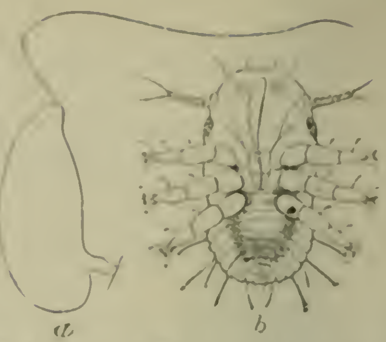

Fig. 5. Pear tree Psylla: a, egg, b larva, greatly magnified (from U. S. Dept. of Agriculture).

The Clover Crop.

The clover seed industry of Ontario is of no small importance. A buyer for one of the large seed houses told me recently that the average total value of the clover seed produced in Ontario for one year was two million dollars. The loss done by insects was fully one-half of a million, or, on the average, one-fourth of the crop. In the large sections where the growing of clover seed has up to the present been quite lucrative, it is almost a complete failure this year. In the south-west counties especially, the work of the Clover Seed Midge has been very destructive. Many good reliable farmers who have been in the habit of feeding off their clover until about the 10th of June have found their second crop of clover badly infested, and they have come to the conclusion that very frequently the eggs are not deposited before the 10th of June. They have frequently observed also that when the first crop of clover was left uncut until about the 20th of June that they secured a good crop of seed from the second crop. It is advisable, therefore, to postpone cutting the first crop of clover until after the 20th of June. The history of the Clover Seed Midge has been frequently described. It is a minute two-winged fly or gnat which lays its eggs in the flower heads of the clover in May or in early June and again in July. There are two broods in a season. The larvæ of the first brood reach full growth about the end of June, when they descend to the ground and change into pupæ, the adults emerging a couple of weeks later. Eggs are again laid in July and from these emerge the second brood of larvæ which injure the fall crop of clover seed.

It is quite probable that the Clover Seed Midge is not the author of all the mischief. I found frequently in clover heads in June a species of Thrips which eats the newly formed seed.

Insect Pests of Shade Trees.

Tussock Moth. The pests of shade trees have been more abundant than usual. In Toronto and the surrounding towns the Tussock Moth has been very destructive. Woodstock and the western towns have suffered severely from the Cottony Maple Scale. While the Spruce Gall-Louse is gradually making its way into nearly all the spruce hedges in the Province.

The life history of the Tussock Moth is well known, and the remedies which have been suggested are quite effective. It lies altogether with the city authorities to stamp out the pest. The most effective methods are the following: First, collect and destroy the masses of eggs which are to be found during the winter on dead leaves, rubbish, and on fences. A very effective way of gathering these would be to offer the children a bonus for every egg cluster collected. Second, to bandage the trees with some sticky substance so that the female, which is wingless, may be prevented from climbing up and depositing her egg masses on the tree. Mr. C. W. Nash, of Toronto, has very pertinently said tnat in the orchard and shade trees every egg mass can be taken off without much difficulty, but "I am sorry to say that the woods for miles around Toronto are now badly infested, and from these strongholds there will be some difficulty in destroying them." He very properly blames the civic authorities for their negligence in fighting the pest at wrong times and with improper weapons.

Cottony Maple Scale. For some years this pest has not been destructive, but this season it seems to have gathered force, and is proving quite serious in some sections. Alarming reports come from Woodstock and London, and Waterloo is becoming anxious as to the effect this pest will have upon the maples.

This pest is quite conspicuous in early June on infested trees with its cottony secretion. This waxy substance is secreted by the female at the time the eggs are being deposited, and forms a protective covering for the eggs. At one end will be noticed the oval, brown scale, the remnant of the mother insect, for this insect belongs to the family of scale insects (Coccidae), to which also belongs the terrible San José scale, about which much has been said, done, and written during the last few years.

The eggs laid by a single scale are very numerous, and begin to hatch about the end of June or beginning of July. At this time swarms of minute lice may be seen crawling on the infested twigs. They soon fix themselves to the bark by inserting their beaks, and begin to suck the sap of the trees. In a short time the young begin to form scales of their own by secreting a waxy substance through certain pores on their body. In September they become adult. The males die before winter, but the females migrate from the leaves to the twigs, where they remain all winter. In spring the females grow rapidly, and the eggs are laid as described in the cottony sack in June.

With regard to remedies, it may be said that whenever a few of the cottony sacs appear the best plan is to cut off and burn the infested twigs, for by doing so thousands of eggs will be destroyed.

However, when, by reason of numbers, this operation becomes impracticable, resort must be had to spraying solutions. Kerosene emulsion and whale oil soap solutions are perhaps the most effective. The standard kerosene emulsion should be diluted with ten parts of water if used alone. Some authorities recommend the use of the mixture—the standard emulsion is diluted with one pound of fish oil dissolved in ten gallons of water.

The best time to apply the mixture is about the first or second week in July, when the young lice emerge from the eggs. They are then easily killed. Winter or fall treatment is also valuable. The same substance may be used, but the solutions should be stronger than those used in summer.

In some cities where the cottony scale made its appearance good results were secured by applying a strong stream of water against the cottony sacs when they contained the eggs, and before these hatched. By reason of the abundance of parasites this pest is seldom troublesome more than two seasons.

GARDEN INSECTS.

A Gooseberry Fruit-Worm. For several years the fruit of the thinnest skinned American varieties of gooseberries have been destroyed by a worm which is the caterpillar of a moth. (Fig. 6). Early in July I received some specimens of gooseberries which were well formed but which had dropped from the bushes. The fruit at this particular time gave no indication that they were infested beyond that they had dropped prematurely and had ripened also prematurely. In a few days, however, the fruit became softened at the heart and the presence of the caterpillar became evident. It had eaten away some of the pulpy tissue near the heart and the fruit had collapsed and decay had set in.

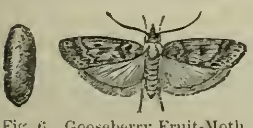

Fig. 6. Gooseberry Fruit-Moth. (*Dakruma Convolutella*) and pupa

I have been unable to breed an adult from the caterpillar. I am of the opinion that it winters over as a pupa. The caterpillar is between one-third and one-half of an inch in length, is white with a slight tinge of green, tapers slightly between both ends, its head and cervical shields are dark brown, each segment of the body has eight little elevations and from the centre of each rises a hair. Mr. Spillett, of Nantyr, has lost nearly his entire crop. It is probable that the only way of dealing with this pest is to spray the young fruit thoroughly with Paris green just after blossoming. Mr. Spillet describes the work as follows. "For the past two years I have had strong suspicions that this falling, which has now become serious, was caused by the presence of a maggot in the berry, as every berry after lying on the ground for a few days had a dark spot appear on the surface of the skin which gradually enlarges until the whole pulp becomes red but not ripe. Again the thick skinned varieties are never affected."

Asparagus beetles. The Asparagus beetle is still marching westward through the peninsula of Ontario. Last year there were but few of them in evidence at Guelph, but this year the 12-spotted species were quite abundant. None of the steel-blue forms (*Crioceris asparagi*) were seen.

At St. Catharines where the asparagus beetles are very numerous, considerable trouble is experienced in preventing damage to the crop. One grower says that he has trained his hens to feed in the asparagus rows, and he is no longer troubled with the pests. Another reports using McBain's carbolic wash (1 to 45) with excellent results.

Other garden Insects. The Squash-bug and Cucumber beetles were not serious pests this season, and not much damage was done so far as I could learn. It is difficult to account for the diminution.

In Essex many complaints were received as to the ravages of the Tobacco Sphinx caterpillar. Few of the growers appeared to see any connection between the caterpillar, the jug-handled pupa, and the large sphinx moth which is often mistaken for a bat. In ordinary years hand-picking the caterpillars is sufficient to keep them in check. In tobacco sections greater attention should be given to the destruction of the pupae, for they are readily seen when the ground is plowed.

Cabbage root maggots were abundant early in the season, but when prompt attention was given to the young crop no serious harm was done. The maggots were readily detected, the infested plants removed, and new plants substituted. Most cabbage-growers prefer to replant rather than use the Goff tar-paper collar.

NOTES ON THE SEASON 1903. (WESTERN QUEBEC.)

By Charles Stevenson, Montreal.

The collecting season was similar to that of 1902. It was very promising during the first months but the low temperature during the latter part of June and St. Swithin's rains throughout the last half of July and the first half of August made insect-hunting out of the question. The latter half of August was good and the results of the net showed that the emergence of many forms of insects had been kept back.

The attractive captures during the season in Coleoptera, were ;—

Hadrobregmus foveatus, Kirby, Montreal, 22nd March.
Eustrophus bifasciatus, Say. Cote des Neiges, 10th April.
Dorcaschema nigrum, Say. Montreal, 14th May.
Brachylobus lithophilus, Chd. Laval Co., 7th June.
Loricera caerulescens, Linn. Laval Co., 7th June.
Callidium aereum, Newm. Montreal, 23rd June.

Arhopalus fulminans, Fab. Montreal (on oak logs) 23rd June.

Obrium rubrum, Newm. Cote St. Paul (by Mrs. Stevenson while sweeping among long grass) 28th June.

Leptura nigrella, Say. Cote St. Paul, 28th June.

Cychrus viduus, Dej. was again taken at St. Hilaire, 25th May, by Mr. G. Chagnon.

In Lepidoptera :— .

Sthenopsis thule, Strecker, 10 specimens were taken by Mrs. Stevenson, between the 6th and the 15th of July at Montreal South, Chambly Co. They were abundant on the first mentioned date, the evening of which was warm and very close. One specimen was caught flying along a street in the village. On the following evenings which were damp with strong cold winds they were scarce and only appeared when the trees or bushes were disturbed by beating.

Pieris napi, Esper, aberrant form *virginensis*, Edwards, was very plentiful at Cote St. Paul between the 3rd and 10th May.

Melitæa phaeton, Drury, was abundant around St. Hilaire, 24th and 25th May.

Sugaring for moths was not a great success. At Montreal West, several specimens of *Gortyna nictitans* Bork. were taken at this bait by Messrs. Chagnon, Norris and myself and one specimen of *stramentosa* Guenée by myself on 24th August.

Collecting at light was fairly good and during August was very encouraging, and many specimens new to the collections of the members of the Montreal Branch were taken. One interesting capture in Coleoptera made by myself while climbing an electric light pole on the 28th of August, was a long horn beetle *Xylotrechus sagittatus*, Germ, and it is probably a new record for this locality (Montreal) as the only specimen I know of in Montreal Collections, is one in Mr G. Chagnon's, from the States, which is a dark brown specimen and my capture is a black variety. The numbers of the Plum Curculio, *Conotrachelus nenuphar* Hbst., attracted to light were surprising.

Many insects injurious to vegetation usually so common have been scarce, but the Tussock Moth caterpillar continues to increase and the trees are thickly covered with their cocoons. The potato beetle *Doryphora decemlineata* Say, was not so generally distributed as in former years although large colonies were to be found in widely separated districts.

The common sulphur, *Colias philodice*, Godt. has been scarce and *Danais archippus*, Linn. was a rare butterfly.

In last year's "Notes" mention was made of a syrphid fly new to Montreal Collectors which I caught at Piedmont. It has been identified by Mr. G. Chagnon as *Criorhina armillata*, O.S. ♀ a species described by Osten Sacken in 1878 from one ♀ specimen taken at Quebec and as Mr. Chagnon cannot find any other record of its capture in Canada or the States it ma be a rare insect of Northern distribution.

NOTES ON THE SEASON OF 1903.

By A. H. Kilman, Ridgeway, Ont.

My time having been fully occupied I have not given much attention to insects, but I have observed that many common species have been unusually scarce. Doubtless, the frequent rains destroyed many insects. Possibly, the vigorous growth of foliage due to the rains conceals the ravages of leaf-eating insects ; at all events, much less than the average amount of injury appears to have been done in this locality.

The plum crop is exceeding abundant, evincing the scarcity of the plum curculio. The cabbage butterfly is, thus far, conspicuously rare. Sugaring for Catocalas in August failed not only to produce those of the "hidden beauty" but also in attracting other noctuids usually so abundant around the bait as Apatela, Agrotis, Hadena, etc.

It may, however, be of interest to mention three observations which I have made of insects not heretofore appearing in injurious numbers in this immediate vicinity.

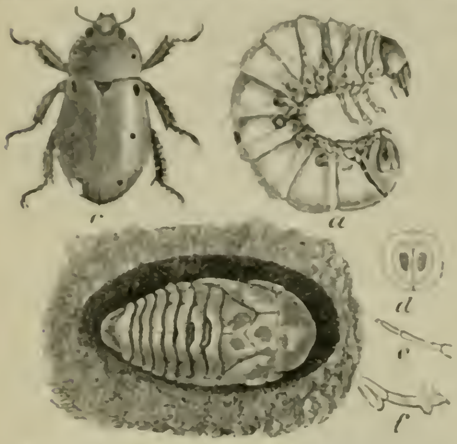

Fig. 7. Pelidnota punctata: *a* the grub, *b* pupa, *c* beetle (clay-yellow with black spots).

A grape grower complained that an insect was eating holes in the leaves of his vines. He said it was a beetle of good size. I asked him to bring me specimens, thinking it would prove to be the grape-vine flea beetle. (*Graptodera chalybea.*) You can imagine my astonishment when he brought a box full of *Pelidnota punctata*, assuring me that I could have more if I wished, and said they were flying among the vines "thick as bees." This beetle is to be found here any year, but it has never before, to my knowledge, appeared in greater numbers than one or two to the vine. (Fig. 7.)

The Rose-beetle has been unusually abundant and destructive this season. I have always thought that a light sandy soil was necessary for the propagation of this insect, and for that reason we might not be much troubled with it, but this year it thrives, even in the rocky soil of Ridgeway.

My third observation relates to *Crioceris asparagi*, Linn. In my collection, the specimens are labelled from Utah and New Mexico supplied by exchange, but I think we need not import any more, dead or alive. The asparagus beds in our gardens produced enough for all the collections in the Empire this year.

Doubtless, its presence has been observed in many places in Ontario ere this, but 1903 marks its advent to this particular part.

It threatens to be a real pest to the market gardener, and if the Society has not already published the best means of suppressing its ravages, it will be well to do so now.

RECENT WORK IN AMERICAN ECONOMIC ENTOMOLGY.

By Dr. L. O. Howard, United States Entomologist.

Dr. Howard prefaced his remarks by giving a brief account of the Division of Entomology in the Department of Agriculture at Washington. He stated that he had now a staff of no less than thirty-seven assistants, many of whom were engaged in field investigations at various distant points, and a grant from the Government of $70,000 a year. He contrasted his position with that of the Dominion Entomologist, Dr. Fletcher, who was expected to cover the enormous territory of Canada, stretching from the Atlantic to the Pacific, with only two assistants, who were employed in the office at Ottawa, and a very limited pecuniary support. He thought that the attention of the authorities should be drawn to this unsatisfactory condition and that Dr. Fletcher's hands should be strengthened and his work rendered more useful and available by a large increase in his staff and a commensurate expenditure for its support. The Division at Washington was now devoting much attention to Agriculture, Sericulture and Forest insects in addition to the usual work upon insects injurious or beneficial to horticulture, fruit-growing and farming.

On the present occasion he would bring before the meeting an account of one only of their operations, as it was of especial interest and importance, namely, the Cotton Boll Weevil and the methods adopted for its control.

THE COTTON BOLL WEEVIL. (*Anthonomus grandis*, Boh).

This destructive insect made its first appearance in Texas in 1894 and has ever since been under the continuous observation of the Division of Entomology. Its life-history and habits have in this way been carefully and fully studied and many experiments have been carried out in order to discover some practical means of keeping it under control. Since its first appearance nine years ago, the insect has been spreading north and east at the rate of seventy-five miles per annum, but is still confined to the State of Texas. The territory occupied by it at the present time includes about 28 per cent. of the whole cotton area in the United States, and this affected region produced in the year 1900 no less than 34 per cent. of the total crop of the United States or one-fourth of the entire production of the world during that year. The vast importance of this investigation can thus be realized. The actual amount of damage caused by the weevil cannot be easily estimated, as the reduction of the crop in any particular year as compared with the average production may be largely caused by unfavourable weather and the attacks of other injurious insects. Making all allowance for this, it is a reasonable estimate that the State of Texas lost during 1902 at least ten millions of dollars through the injury caused by this insect. It is thus evident that the Boll Weevil is one of the most formidable menaces to a great agricultural and commercial industry that has ever arisen in America or elsewhere.

In addition to the loss occasioned at the present time, there must be taken into consideration the fact that the insect is spreading with great rapidity and will, before many years are over, infest the entire cotton-growing region of the southern States. In Mexico, where it has been a recognized pest for a much longer period of time, the only limit to its spread that has been observed is that of altitude ; at 3500 feet above sea-level it ceases to exist, but unfortunately in the United States no cotton is grown at any such height above the sea. There is no probability that the insect will ever be exterminated ; like many other injurious insects, when once established in a region where its food-plant is abundant, there it will continue to exist. It remains, therefore, to find out some means by which it can be kept under control and some plan by which cotton may be profitably grown. This important problem, it is believed, has now been virtually solved by the Division of Entomology.

Dr. Howard then gave an account of the measures that had been adopted. Last year (1902) the Division received a special appropriation which enabled it to conduct field work on a large scale and to practically test the system that promised the best results. A contract was made with certain planters who agreed to plant, cultivate and care for the cotton crop on their lands in exact accordance with the directions of the agent of the Division ; in return an engagement was made that the owner should be fully compensated for any loss that he might sustain from failure to produce an average crop. Two large tracts of cotton, one of 200 acres, the other of 150, were secured in this way and the Division was enabled to apply any experiments that appeared desirable without incurring the labour and expense of renting the land and working the crop. The experience of previous years had demonstrated that a profitable crop of cotton could be secured, notwithstanding the presence of the boll weevil, by carrying out the following method :

Using seed from plants grown as far north as possible in order to ensure early maturity.

Planting as early as the season will admit, for the same purpose.

Cultivating the fields thoroughly in order to stimulate the growth of the plant and its early maturity.

Planting the rows as far apart as experience with the land shows to be feasible, and thinning out the plants in the rows thoroughly. The boll weevil thrives best where there is shade; when the rows are well apart there is a minimum of shade.

Finally, destroying by plowing up, windrowing and burning, all the cotton stalks in the field as soon as possible after the crop has been gathered—this should be not later than the first of October. The object of this is to kill all the weevils that are still about the plants and to leave them no protection.

By producing an early growth and maturity, the cotton may be harvested before the weevils had done very much damage. In ordinary methods of cultivation, the gathering goes on through all the autumn months and is only finished, perhaps, in December. The object should be to have the work of gathering completed by the first of October; then to burn up the plants and thus reduce very largely the attack of the weevil during the following year.

The experiments of the Division on this large scale attracted great attention throughout that region of Texas, and their success furnished an object lesson of great value to the planters, which the majority of them will now follow in their own practice.

Dr. Howard's clear and interesting address was listened to with great attention, and it came home to the minds of many of those present that similar practical methods might with advantage be adopted in the warfare against several other destructive insects. The thanks of the meeting were very heartily accorded to him.

Several of the members spoke of the very great disparity between the means furnished by the United States Government and our own in the warfare against noxious insects. It was agreed that every effort should be made to draw the attention of the Canadian Government to the advisability and the necessity of providing Dr. Fletcher with a sufficient staff of assistants and adequate means for carrying out investigations all over the Dominion and providing the community with the fullest possible information regarding insect attacks and the best methods of dealing with them.

A MENACE TO THE SHADE TREES OF LONDON, ONT.

By Rev. C. J. S. Bethune, London.

The city of London, Ontario, owes its beauty and attractiveness to its broad streets line with double rows of trees and its well-kept lawns and boulevards. If any wide spread injur were done to the trees it would be a very serious calamity indeed. It is well therefore to b on the lookout and not allow an enemy to become established if measures can be taken t prevent it. Unfortunately the great majority of the trees are maples; here and there may b seen a linden, a horse-chestnut, a honey-locust, a catalpa, and in the parks and gardens a fe other trees, but those that line the streets are virtually maples. Any insect, therefore, tha attacks these trees is likely to be found all over the city, and consequently the difficulty o dealing with it would be very great; wholesale measures would require to be resorted to an the expense involved would no doubt alarm the ratepayers. Under these circumstances it i well to sound a note of warning and draw attention to a menace which threatens the health, not the life of the trees.

During the past summer anyone walking in the tree shaded streets could hardly fail t have noticed round stains upon the pavement, resembling large drops of rain, and in som places great patches of similar stains, blackened or dark brown in colour. These were cause by a minute scale insect which was at work in countless millions upon the underside of the leaves (Fig. 8, *e*), sucking out the juices of the tree and excreting a sweet sticky fluid called "honey-dew," which drips upon the leaves below, making their surface shine in the light, and then down to the pavement or ground beneath. On this honey-dew grows often a minute fungus, which gives it a dark colour and frequently forms black patches on the withering leaves. At the same time there could be seen hanging from the twigs, and here and there upon the limbs, fluffy cottony tufts, pure white in colour; these are the female scale insects which cover their masses of eggs with this waxy substance. (Fig. 9.) A single individual produces one or two thousand eggs; when hatched the minute larvæ swarm over the nearest twigs and leaves for a few days and then fix themselves permanently on the under side of the leaves, attaching themselves closely to the ribs; a few may occasionally be found on the upper surface and on the twigs After a short time a waxy scale is formed, oval and convex in shape, completely covering the tiny insect.

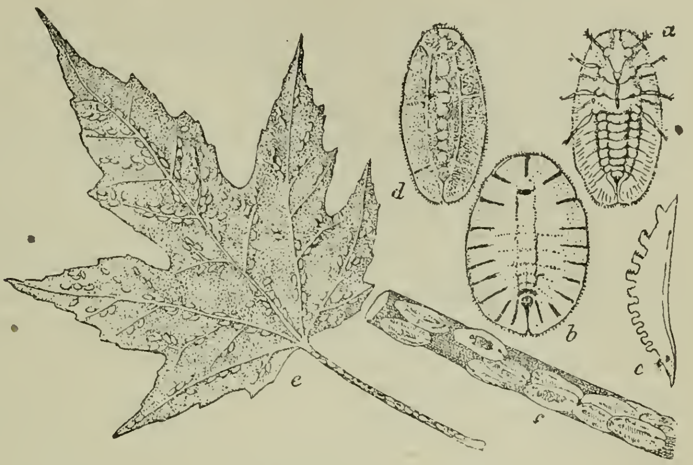

Fig. 8. Cottony Maple Scale: *a* Newly-hatched young; *b* Female from above; *c* Side view; *d* Male; *e* Same, natural size, on leaf and stem; *f* Same, enlarged—all greatly magnified except *e*. (From U. S. Dept. of Agriculture.)

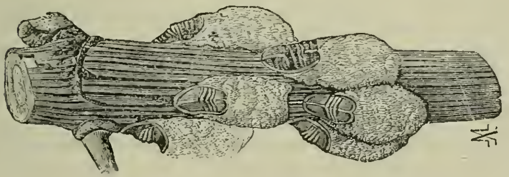

Fig. 9. Cottony Maple Scale: Female and egg-masses.

The insect is called the Cottony Maple Scale (*Pulvinaria innumerabilis*, Rathv.), but is found upon a large number of other trees, and in London seemed to be more abundant upon the basswood (linden) than upon the maple, judging from the extent of the stains beneath the former trees and the drooping appearance of their leaves. Mrs. Fernald, in her recent Catalogue of Coccidæ, mentions no less than twenty-four food plants upon which it has been found; it is evidently then a general feeder and by no means particular in selecting an object of attack. Sometimes it is called the "Grape-vine Bark-louse" from its prevalence upon that plant.

Towards the close of summer these creatures have become mature, and about the end of August or early in September, the winged males, tiny little flies, appear; the females do not acquire wings but remain beneath their waxen scales. After mating, the males die and the females, before the leaves fall, migrate to the twigs and there remain during the winter. At the opening of spring they grow rapidly and soon become distended with the quantity of egg produced. In May or early in June the formation of the egg sac begins; this is composed of threads of wax extruded from the body in great numbers till they form the large cottony tuft already referred to. In this mass of filaments the eggs are deposited and there they remain till the end of June, or well into July, and then produce the myriads of orange coloured lice, thus completing the annual life history.

With so wide-spread an attack it seems almost hopeless to prescribe a remedy. Spraying with kerosene emulsion made with coal-oil and soap suds, will destroy the young lice, even using a diluted mixture, but not the eggs; it will therefore require to be repeated several times at intervals of about a week, as the eggs do not all hatch out at once. This should be done as soon as the young lice are seen to appear, usually about the end of June. Much may be done also by cutting off and burning or crushing the twigs infested by the cottony masses, as early in the season as they are first noticed; the appearance of the white tufts indicates that the female is producing her mass of eggs. A tree that is known to have been badly infested should be pruned in the winter and the cuttings burnt, as the scales hibernate on the twigs, and a large number may thus be destroyed.

Though the attack this year in London is general throughout the city and is certainly serious, some comfort may be derived from the fact that this injurious insect is usually kept in check by its natural enemies, especially by the lady-bird beetles and minute ichneumon flies, and probably by fungous diseases and sudden atmospheric changes. After a few years of abundance, during which it inflicts much damage, it often ceases for a considerable time to be noticeable. Outbreaks somewhat similar to the present, though perhaps not quite so serious, have been recorded at intervals. In 1898, for instance, Mr. R. W. Rennie mentioned in the Report for that year that this insect appeared in such numbers that "on one of the finest streets in the city (London) the trees looked as if they had been sprayed with whitewash."

In the discussion that followed upon the reading of the paper, Dr. Howard said that he thought the abundance of the scale this year was caused by the excessive moisture of the last two seasons. The chief parasitic enemies of the insect are minute ichneumon flies, which are unable to fly about and lay their eggs in wet weather; consequently the scales were not kept in check as they would be in fine dry weather. He had noticed that aphides thrive best in wet seasons, and evidently for the same reason. The usual experience was that there were rarely serious outbreaks of this scale for two consecutive years, as their natural enemies kept them in check.

THE PRESENT CONDITION OF THE SAN JOSE SCALE IN ONTARIO

By W. Lochhead, Ontario Agricultural College, Guelph.

It is now nearly ten years since the San Jose scale made its appearance in the United States east of the Rockies, and it is about seven years since it first appeared in Ontario. It has made progress in that time in spite of all the efforts which have been put forth to keep it under control. In the St. Catharines district there are but few orchards which have escaped invasion, and many have succumbed to the terrible attack. In the West the scale is very prevalent in South Essex and Kent. Although the scale is so wide spread in these districts, yet we must remember that if it had not been for the energetic action of the Government in appointing inspectors, and in passing the Fumigation Act for the treatment of nursery stock, in my judgment the scale would have spread to most parts of the Province.

Never before has the San José scale problem seemed so easy of solution as it is to-day. After long experimentation we now know that we have methods which are both effective and easy to apply. The whole solution of the difficulty lies now with the fruit-grower himself.

There are five more or less effective remedies—first the lime, sulphur and salt mixture ; second, crude petroleum ; third, crude petroleum and whale oil soap emulsion ; fourth, whale oil solution ; fifth, the McBain Carbolic Wash. With regard to the lime, sulphur, and salt mixture, its effectiveness was demonstrated beyond doubt by Mr. G. E. Fisher, and it is being extensively used, in the West particularly, as an effective remedy. The chief points of excellence of this mixture are ; first, its cheapness ; second, its effectiveness ;—third, its cleansing effect upon the tree from both insect and fungus pests. The fact that it is somewhat difficult to prepare and hard on the men and apparatus, has made this mixture unpopular with some of our fruit-growers. Where the fruit-grower has the proper appliances for making the mixture it does not seem so difficult as it appears.

The crude petroleum is well adapted in the West for apple treatment, and in the Chatham district I fail to hear of the death of a single tree. In that district the oil is easy to procure and the fruit-growers are well pleased with the results. The objections which have been urged against crude petroleum are : (1) the great variation in strength of the oil, (2) disagreeableness of application, and (3) the great liability of its injuring plums and peaches.

The emulsion of crude petroleum and whale oil soap, although a very effective remedy, has never taken well with the fruit-growers, on account of the difficulty which was found in making the emulsion and of the disagreeableness of the application.

Whale oil soap solution although quite effective when properly applied proved too expensive for the average orchard, and has been given up.

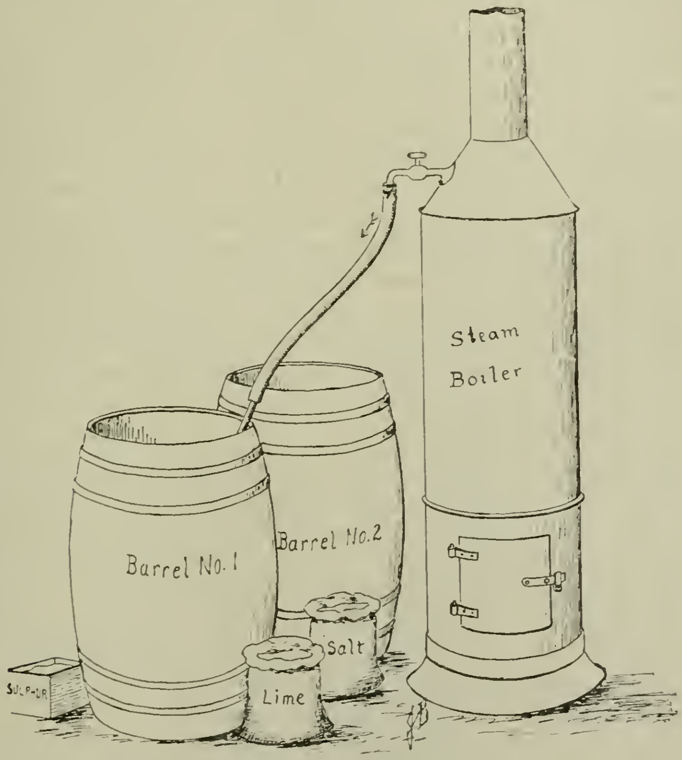

Fig. 9 *a* W. W. Hilborn's appliance for making the lime-sulphur-salt mixture.

The McBain Carbolic Wash is a new insecticide which has been tried for the first time in Canada this summer and has given good satisfaction wherever it has been tried. Further experiments are necessary however, to determine if the winter applications of the carbolic wash will prove as successful as the summer applications.

The lime, sulphur and salt treatment, which the Essex fruit growers are using quite freely, is extremely cheap. Mr. J. D. Wigle, of Kingsville, tells me that it cost him but ten dollars for outside help to spray forty apple trees and eight hundred peach trees with this mixture. Mr. W. W. Hilborn, of Leamington, is also quite enthusiastic over the mixture. He had some hesitation last spring in using it, but when he came to prepare it he found it much simpler than he had expected. He used a boiler, which he procured for ten dollars, to supply the steam for boiling the mixture. He used the 15, 15, 10 formula. The lime he slaked slowly in a coal-oil barrel with four gallons of water; then the sifted sulphur was added with stirring to the hot mixture, and the whole boiled for an hour; then the salt was added and the mixture boiled for half an hour longer. Mr. Hilborn kept a second barrel of hot water always convenient. This mixture was very effective, and I failed to find a single scale at the time of my visit, August 27th. It was applied also against the Scurfy Bark Louse and the Oyster Shell Bark Louse, and the results were extremely satisfactory. The township of Gosfield in which Kingsville is situated passed a by-law last spring compelling treatment of infested orchards, and a township sprayer, Mr. H. Bruner, was appointed to do the work whenever the owner himself cared not to spray. The results were quite satisfactory to most of the fruit-growers, and they see now the solution of this problem of the San Jose Scale. In the St. Catharines district, however, the lime, sulphur and salt treatment has not become popular, but no one seems to doubt its effectiveness against the scale. Mr. G. A. McBain has had a very interesting experiment under way, testing the effectiveness of his "Carbolic Wash." (Plate 1.) He undertook to clean up the Henry Kottmeier orchard which contains about four hundred trees, mostly plum of five years' growth. Mr. McBain has given the orchard three applications. The first was made with his winter wash on the 28th and 29th of April, the second with the summer wash on 14th and 15th of July, the third with his summer wash on the 14th and 15th of August. The winter application, although fairly satisfactory, did not kill all the scale, but as large a percentage as one could naturally expect from the encrusted condition of the trees. Besides Mr. McBain tells me that he could now guarantee a much larger percentage of scale killed because he was afraid to use a stronger formula than the one he had been using in California. I examined the orchard on the 14th of August, before the third application and found but few scale on the trees. The trees looked healthy and had made a decided growth. Some of the leaves of the trees had been singed by the summer mixture, but I think no appreciable damage would be done.

The McBain Carbolic Wash has been in use for some years in California as a scale remedy. It is a black, oily liquid, and smells strongly of crude carbolic acid. The other ingredients are pine tar and fish oil. The strong point in favor of this wash is the readiness and ease with which the spraying liquid can be prepared. When a barrel of liquid is to be made up, 2 or 3 gallons of the black Carbolic Wash are placed in the barrel and cold water added. The wash dissolves very readily, and the barrel of liquid has a milky appearance. Another feature of the preparation is that its application by the spray pump is not an unpleasant operation. The operator does not need a special suit of old clothes, as he does if he were spraying crude petroleum, whale oil soap, or the lime, sulphur and salt mixture.

In my judgment the points of the McBain Carbolic Wash which I have indicated are very important ones in future operations against the San José scale, for experience proves that the ordinary fruit grower is influenced mightily by the character of the spraying operation. I believe that the main reason why the crude petroleum, and the other preparations which are effective against the scale, did not take with the people was this very factor—the disagreeable nature of the spraying. As we all know, a perfect insecticide must possess the following qualities:

1. It must be effective against the insect; 2. It must not harm the plant; 3. It must be readily and easily applied; 4. It must be cheap.

From my observations this McBain Carbolic Wash possesses at least three of these qualities, and it may have the fourth also, for I do not know what the retail price of it will be. This is an important point, but if the manufacture of the substance is to be made a business matter, then I have not much fear on this point.

In addition, there is ground for the belief that this wash is valuable not only for controlling the aphis of apple, plum and cherry, but also as a fungicide for peach leaf curl, apple scab, and the brown rot of plum, when used at the rate of 1 to 30.

Now as to the future of the San José Scale. I do not advocate that the Provincial Government should continue to lay out large sums of money every year in fighting the Scale. They might with just as good reason be asked to spend money in fighting the Potato Beetle, the Codling Moth, or the Hessian fly. The Government, I maintain, has done its duty with regard to the Scale; and now that reliable, efficient remedies are known, the matter of controlling the pest must remain with the fruit-growers. I am sure that the Government is willing to assist the fruit growers with advice and even with help when necessary.

This help should came in the form of reduction of cost of chemicals, as has been given in previous years, and in establishing a system of Township Sprayers under Governmental supervision, perhaps. To my mind the greatest need at the present time is not a new remedy, for we have efficient ones already, but an organized system of sprayers by whom every orchard can be sprayed at *a reasonable cost, at the proper time*, and *in the proper manner.* Many of our smaller fruit-growers have neither the outfit for doing good work, nor the time and help to spray at the proper season. They would be perfectly willing, however, to pay for the spraying of the orchards by a reliable party. In Gosfield Tp., Essex County, a township sprayer was appointed last spring, and so far as I could learn from inquiries in the vicinity, the fruit-growers are thoroughly satisfied with the results. A prominent grower told me that he no longer feared the Scale so long as he could get his orchard sprayed with the lime, sulphur and salt mixture, and by reliable sprayers at a reasonable cost. (See Plate 4.) A St. Catharines fruit-grower thinks the McBain Carbolic Wash solves the difficulty in regard to keeping the Scale in check. He thinks that there will now be no difficulty in finding good sprayers to do the work since the wash is not disagreeable to use. He said that his own men looked upon the spraying operations with crude oil, or the whale-oil soap, as a veritable ordeal.

There is another matter in regard to the Scale which should be attended to as soon as possible. In the scale infested sections there are orchards which are never sprayed. As a result they are neglected, and they form veritable breeding grounds for the Scale and other pests. I know of several orchards which are thus neglected (Plates 2 and 3). It is not fair to he other fruit-growers that they should be exposed to such conditions.

The townships should see to it, and pass a by-law compelling the spraying of the neglected orchards, or to have them cut down and burned. The Government might very reasonably look fter the inspection necessary for the proper carrying out of the by-law. We all know how uch a by-law would soon become a dead-letter through difficulty in getting the local authoriies to carry out its provisions. An outsider can carry on the work, but a local man cannot.

Furthermore, fruit-growers must recognize the necessity for at least one spraying every ear. In badly infested orchards two sprayings should be made.

Finally, good spraying outfits—a 5-ply hose—not an ordinary garden hose, should be used.

NOTE ON THE GREAT LEOPARD MOTH.

Ecpantheria scribonia, Stoll.

BY REV. C. J. S. BETHUNE, LONDON, ONT.

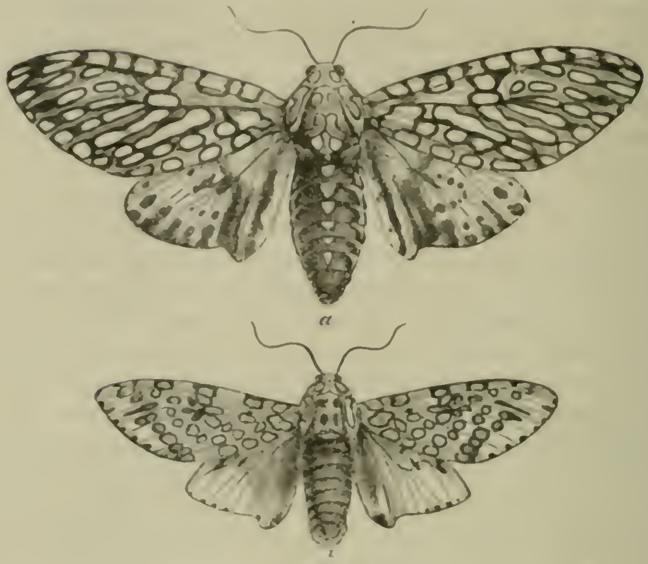

Fig. 10.

On the 6th of May, 1903, in a wood some six miles south of London, I had the good fortune to find a large hairy larva, rolled up in a ball and occupying a round cell that it had made of dried leaves beneath a log. As Mr. Arthur Gibson, of the Experimental Farm at Ottawa, was then engaged in the study of the Arctiadæ in connection with his valuable paper on the genus Apantesis, recently published in the *Canadian Entomologist*, I sent the specimen to him. A few days after it reached him—on May 11th—it assumed the pupa state and on the 4th of June the imago appeared. To our mutual delight, it proved to be the Great Leopard Moth (*Ecpantheria scribonia*, Stoll).

Though this moth is rarely taken in Canada, the larva is occasionally found in the autumn when it is full grown and in the spring, as in the present instance; it hibernates under logs, the loose bark of decaying trees or other suitable hiding place. Whether or not it takes any food in the spring before changing into a chrysalis is a matter of doubt. The specimen referred to evidently did not, as I found it in its winter quarters and it had no food after its capture. The food-plants, so far known, are the Willow, wild Sun-flower (*Helianthus decapetalus*), Poke-berry (*Phytolacca*), and Plantain.

Mr. Gibson has kindly furnished me with the following careful description of my specimen when it reached him:

"Length 43 mm. General appearance—a stout, black larva, with stiff, shiny, jet-black bristles. Head 4 mm., wide, subquadrate, flattened in front, only slightly bilobed at vertex, black, shiny excepting posterior upper part of cheek near segment 2, which is pale brownish; median suture and epistoma dull whitish; mandibles slightly reddish; hairs on face mostly black, reddish at tips. Body stout, dull black, with patches and streaks of velvety black on dorsum; distinctly yellowish in the incisures; lower lateral and ventral surface paler. Tubercles large, all black, excepting vi., vii. and viii., which are a dark amber colour, each bearing a bunch of stiff, black, barbed bristles; from v., vi., vii. and viii. many of the bristles are tinged with dark red. Tubercles i., ii. and iii. are nearly the same size, iv. elongate. Spiracles dull orange, anterior and close to, but above tubercle iv., on abdominal segments. All the feet shiny brown tipped with black." (Fig 11).

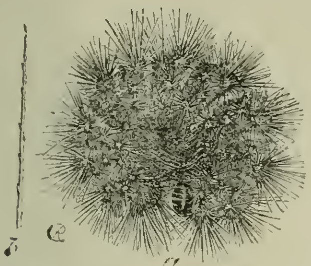

Fig 11. Larva of Leopard Moth. *b* spine magnified.

This larva, it will be observed, differs somewhat from Abbot and Smith's figure (Lep. Insects of Georgia, p. 137, plate 69) and other descriptions, in that the specimen was all black except the narrow yellowish shading in the incisures. There were no red bands between the segments.

The moth, shewn in the accompanying figures, (Fig. 10, after Riley) *a*, the female, *b*, the male, is a very remarkable and beautiful creature. The wings, head and thorax are white, and covered, except the hind wings, with rings or spots of black ; the hind wings of the female have an outer border of blue-black spots, and of the male a long black stripe, terminating in a spot near the inner margin ; these markings, however, are variable, in some specimens the spots are all rings and in others filled with black or brown. The upper portion of the body is steel blue in colour, with—in the female—a lateral stripe of orange and a row of dark spots. The wings of the male expand about two inches and a quarter, while those of the female are fully three inches from tip to tip.

A CARD SYSTEM FOR NOTES ON INSECTS.

By Albert F. Winn, Westmount, Que.

The myriads of curious and interesting facts, which the student of entomology is certain to observe, make it necessary to have something more than the memory to rely upon. For field notes a pocket memorandum book is indispensible, but for reference these notes must be transcribed into some form in which one can classify the subjects to some extent. I have tried various sorts of books, large and small, the most satisfactory having been a ledger with a page or half page reserved for each species about which any notes were made. The index in the book served to find the page of any desired subject. But there were many ways in which this was unsatisfactory ; the book was necessarily large, in many cases pages were left for species on which only a few lines were used, while in others not nearly enough space was left and notes had to be marked "continued page 260" etc. Arrangement of species as to scientific order was impossible, and notes on species described as such, which afterwards proved to be synonyms were hundreds of pages apart.

I do not know who invented the card index system but you are doubtless familar with one or more of the countless varieties of these time-saving devices, which can be adapted to almost every form of business, and which are "always complete but never finished." The standard size of card used is about 3 inches by 5 and these already cut and ruled with faint lines are to be had from city firms handling office supplies. as can also the cards for dividing and indexing the different genera, and alphabetical index. It is well to use cards that are thin, because they will not take up so much space, and a great many cards will be required to keep adequate notes on the subjects that we try to work up.

I found it necessary to have three distinct parts to make the index complete—a diary, in which to keep track of notes in order as to date of observation ; an alphabetical index ; and a series of cards one or more for each species about which any records are made. For the diary portion I begin with a colored card marked 1903—followed by divisions for the various months, parts of the cards being slightly over the 3 inches high so as to show the name above the cards on which the notes are recorded—January February March could be put together, as references would likely be few. A card for each day on which anything is noted is inserted in its place according to date. This makes a very compact record of the year's captures, and additional notes on species observed by fellow collectors, which one hears about a week or more later, can be dropped into their proper place in a manner quite impossible in any book. To cross index this the alphabetical index is required. Let us say a trip to Quebec is taken August 21st to 24th, 1902. Separate cards mentioning each day's notes are put in place in the diary behind the August card and in the alphabetical index a card is inserted, behind letter "Q", headed *Quebec.*: "Spent a few days at Quebec Aug. 21-24 1902." On the Quebec card would also be noted references to published papers on insects found at Quebec, etc.

If a species of interest is taken, say *Pamphila Manitoba*, a card headed with the name of that species is marked "1 specimen Island of Orleans, Quebec, 21-viii-02, on everlasting flowers, A. F. W." All further original notes, or references to published matter are put on this card till filled, when a second card may be used. To find the cards quickly, they are arranged alphabetically behind a genus card whose name shows at the top, and the genera are arranged in families in the same order according to some List. Perhaps it would be more consistent to arrange the genera alphabetically also, but it seems easier to look for *Grapta* next to *Vanessa* than to work alphabetically. When a new List appears, and the names get changed around, a few cards will have to be inserted here and there indicating that the genus *Hepialus* has been transferred to the Micros or elsewhere, or that some genus has been divided into a dozen or so. The alphabetical index could be used as a sort of directory.

For life-history work the cards seems specially useful, as an unlimited number of cards may be used numbered consecutively, keeping track of egg, various stages of larva, chrysalis and imago. If a stage or more is missed one season, the information can possibly be obtained another year and another card inserted in its proper place.

ADDITIONS TO THE SYRPHIDAE OF THE PROVINCE OF QUEBEC.

By Gustave Chagnon, Montreal.

Since the publication in 1901 of my "Studies on Canadian Syrphidae" in which were described about 90 species of these flies, more material was collected and carefully examined. Amongst this material, some of which was collected by Mr. Stevenson, of Montreal, and Abbé Roy, of Levis, were found several important additions to my list. The following is a brief account of these additions.

Criorhina armillata, O.S. One ♀ specimen was captured at Piedmont, on 7th June, 1902, by Mr. Charles Stevenson. This species is quite different from those already given in my "Studies" by its black abdomen and by the anterior cross vein which is nearly rectangular and placed slightly before the middle of the discal cell.

This species was described by Osten Sacken in 1878, from one ♀ specimen taken at Quebec. Its geographical distribution seems to be northern as I cannot learn of its capture in the United States.

Merodon equestris, Fabr. Taken at Outremont, on 7th July, 1901. This specimen is doubly interesting as being perhaps the only capture in the new world of a species belonging to an European genus of which no representatives have been recorded in North American lists. It is closely allied to *Eristalis* by its front being evenly arched and the third longitudinal vein being strongly bent into the first posterior cell.

Pipiza nigripilosa, Will. This species is easily separated from the others by having a long black pilosity on its body. It was captured by myself at Sherbrooke, on 30th May, 1902, while collecting with Abbé Begin of that place.

Platychirus peltatus, Meigen, ♂. Like the preceding, this species was taken at Sherbrooke, on 30 May, 1902. It appeared to be quite common and about 10 specimens were taken in a short time. The front tibiæ of the ♂ are suddenly dilated at the tip; the front metatarsi much dilated, the remaining joints but slightly so. The other two species occurring in our fauna, are *quadratus* and *hyperboreus*. A Sherbrooke specimen said to be *chætopodus* was sent to me for study, but I could not verify it on account of the bad condition in which the specimen was.

Leucozona lucorum, L. One ♂ specimen received from Abbé Roy, of Levis. This species was recorded from Canada by Osten Sacken a good many years ago. It is a handsome syrphid, the basal half of the abdomen being yellow and the remaining half black.

Syrphus amalopsis, O. S. Captured 2 specimens at Sherbrooke, 30 May, 1902. This species looks very much like our *umbellatarum*, but the bands are club-shaped at their inner ends.

Pirophaena ocymi, Fabr. I had the good fortune to take one ♀ of this species at Maisonneuve in August last. In structure, they are closely allied to *Melanostoma* and *Platychirus*, but distinguished by the flattened abdomen which is a long oval in shape and more narrowed towards its base, so that its greatest width is attained at the end of the third segment; the wings are also shorter and broader, scarcely projecting beyond the end of the abdomen. This species is also European.

Mr. Winn kindly gave me a ♂ specimen captured near Montreal a few years ago.

Sphegina lobata, Loew. I have just received one specimen of this species from Abbé Roy, Levis. Differs chiefly from *rufiventris* by its black body with yellow spots on the abdomen.

AN INTERESTING ENEMY OF THE IRIS.

By Arthur Gibson, Division of Entomology, Central Experimental Farm, Ottawa.

In Dr. James Fletcher's Entomological Record for 1902 published in last year's report, the following note appears: "*Macronoctua onusta*, Grt., two specimens reared from larvæ feeding in and on stems of *Iris versicolor*, L., emerged 3rd Sept., Montreal (Winn)."

In July last the writer noticed that some borer was at work in the Iris beds at the Central Experimental Farm, and upon investigating further, specimens of a noctuid larva from which were reared moths of *Macronoctua onusta*, Grt., were found in different stages of development These caterpillars were first collected on the 28th July, and at that time their presence in the beds could easily be detected by the discoloured, partly dead leaves of the plants. The Irises which were chiefly attacked were *Iris spuria*, L. and *Iris biglumis*, Vahl., although specimens of the larva were found working in several other species. These larvæ first attacked the stems some inches above the ground and gradually worked downwards, the mature caterpillars being found right in the roots below the surface of the ground.

The occurrence of this larva at Ottawa, particularly in destructive numbers, is very interesting. The moths are rare in collections and there is only one record of the insect having been taken here previous to this year, viz. an imago on the 29th Sept. 1902, by Dr. Fletcher.

Like other borers, these larvæ are smooth and not particularly beautiful. When mature they measure about an inch and a half in length, and in general appearance are flesh-coloured caterpillars with a more pronounced pinkish tinge above the spiracles. The head is a rich chestnut red, shiny, rounded, but rather wider than high, bilobed, flattened in front; margins of clypeus and mouth parts darker than the rest of the head; ocelli black; lateral edge of cheek touching segment 2 black. Body cylindrical, plump when full grown, but before maturity rather flattened dorsally as if starved. Thoracic shield shiny, slightly wider than head, testaceous, darker at margins, traversed in the centre of dorsum by a pale line. Tubercles inconspicuous, black, No IV. lying behind the spiracle. Spiracles conspicuous, elongate, black. Anal flap and thoracic feet testaceous ; prolegs concolorous with venter, claspers black.

On the 30th July one larva entered the earth in the breeding jar for pupation, and within the next week or so other specimens also buried. The pupa is 21-24 mm. in length and 6-7 mm. wide at widest part, chestnut brown, shiny : anterior margin of abdominal segments minutely pitted, posterior margin conspicuously pitted. Cremaster dark, almost black, bearing two stiff capitate spines at extremity and three others on either side above—in all 8 spines. The first moth emerged on the 9th Sept., and other specimens appeared soon afterwards.

BASSWOOD, OR LINDEN, INSECTS.

By Arthur Gibson, Division of Entomology, Central Experimental Farm, Ottawa.

The insects which feed upon the basswood, or linden, tree have not of late years, as far as the writer knows, been given special attention by any Canadian students of forest and shade-tree insects. Since the appearance of the chapter on "Insects Injurious to the Basswood, or Linden, Tree," which appeared in the Fifth Report of the U. S. Entomological Commission—Insects Injurious to Forest and Shade Trees—by Dr. A. S. Packard, nothing of length has been published that we are aware of. During the past three years we have, however, endeavored to note particularly the insects which feed upon the basswood tree, and in the preparation of this article frequent use has been made of the published notes of other observers. In some of the back reports of our Society excellent articles have appeared on the insects which have been found feeding on certain of our native trees, and it is hoped that other members will continue the study of insects which attack the same kinds of tree, so that our knowledge of forest insects in general may be thereby increased.

In Canada the only native species of basswood is *Tilia Americana*, L. with its variety *pubescens*, Loud. The typical form is abundant throughout Ontario and Quebec and extends from New Brunswick as far west as Manitoba. In his Catalogue of Canadian Plants, Macoun states that the variety *pubescens* occurs about Quebec, along the shores of Lake St. Clair, and near Sandwich, Ont. The European Linden, *Tilia Europæa*, L, has been cultivated and extensively planted in many of our towns and cities, and may be frequently found growing in parks and on lawns as an ornamental tree. It is apparently quite hardy and thrives well in our climate. Another species, *Tilia heterophylla*, Vent. is common in woods in the eastern United States, from New York to Florida.

The lumber of basswood is light, soft, but rather tough, and, as one of the woods known as "whitewood" is largely used in the manufacture of drawers and similar cabinet work, cheap furniture, woodenware, etc. Many of our boatbuilders purchase quantities of this timber for making small boats and canoes, and owing to the fact that the wood can be bent readily it is also used for dashboards of carriages. For many years the wood has been used, particularly in the Province of Quebec, for making snow shovels, and even to-day wide use of the wood is made for this purpose. In Europe the inner bark, known as bast, which gave origin to the common name, is largely used in making coarse cordage and matting, but this industry has never attained any importance in America.

The value of the linden as a shade tree is well known, and the following paragraph taken from Farmers' Bulletin No. 99, U. S. Department of Agriculture—Three Insect Enemies of Shade Trees, by Dr. L. O. Howard—is of special interest here.

"In selecting shade trees, particularly for small cities and towns in agricultural regions, and even to a considerable extent in large cities, the relative honey producing qualities of the proposed shade trees is a matter of some little importance ; not so much perhaps, in the matter of actual food for the ordinary honeybee as in that of the increase of bees on account of their great value as cross fertilizers of orchard trees and forage crops. From this point of view there are five very important honey producers among the principal shade trees. These are, in order of importance : American linden, tulip tree, black locust, horse-chestnut, and sugar maple."

When insects occur in destructive numbers in our forests it is an exceedingly difficult matter to bring to bear any remedial treatment, in fact in most instances it is impossible to cope with these enemies. In cases, however, where basswood trees are grown, or allowed to stand, for ornamental purposes, it is usually possible, when such are attacked by insects, to apply a remedy. As it has often been stated in these pages, insects from a practical point of view may, roughly speaking, be divided into two classes, viz. those kinds which bite their food, such as caterpillars, and those which derive their sustenance by sucking up their food in a liquid form, by means of their beaks, as plant lice. For the first class some poison, such as Paris green, must be applied to the foliage, which will be eaten with the same, but for the second class some liquid, like kerosene emulsion, or whale-oil soap, which will kill by contact, must be used. There are, however, many insects which bore into the wood of the tree, and which cannot be reached by any of the above remedies. Usually, however, it is only trees which have been injured in some way, as by lightning, or wind, or are in an unhealthy condition, that are resorted to by the mature females of these boring insects for egg laying. For these, remedies of a preventive nature are usually adopted, one of the best of which is to wash the trees, particularly the trunks with some deterrent or malodorous mixture which has the effect of preventing the females from laying their eggs.

Insects, therefore, which feed upon the basswood may be divided as follows, viz :—

Those which attack the foliage,
Those which occur on the bark,
Those which bore into the wood.

The following list of species covers all we have noted at Ottawa, as well as many which have been recorded by other writers in the various, somewhat limited, publications at our disposal.

ATTACKING THE FOLIAGE.

ORDER HOMOPTERA.

1. The Linden Tree-louse, *Lachnus longistigma*, Monell. This is a species of plant louse which feeds on the leaves, by means of its beak, through which it sucks up the juices. It is found in Canada in late summer but does not occur anywhere in injurious numbers.

2. The Obtuse Clastoptera, *Clastoptera obtusa*, Say. This is one of the tree hoppers, and is recorded by Lintner in his report for 1891, as having been found on linden. The insect occurs at Ottawa, but has never appeared in Ontario, Dr. Fletcher tells me, in injurious numbers. Van Duzee recorded it as common on blueberry in the Muskoka Lakes District.

ORDER HEMIPTERA.

3. The Basswood Aphis, *Pterocallis tiliæ*, L. has been very abundant at Ottawa the past season. Early in July the plant lice were numerous in all stages, and specimens were kindly identified by Mr. Theo. Pergande, through the courtesy of Dr. Howard. This plant louse is a beautiful aphis, and like other aphids can be held in check by spraying with whale oil soap, or kerosene emulsion. The trees attacked were covered with honey dew and blackened by the fungus *Fumago salicina* which grows thereon.

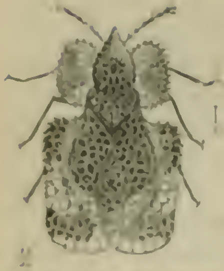

Fig 12. A Tingis (greatly magnified)

4. *Tingis tiliae*, Walsh. This beautiful little lace-like plant bug (Fig 12) may frequently be found in small colonies beneath the leaves. It cannot be said to do much injury to the trees.

ORDER COLEOPTERA.

5. The Linden Leaf-beetle, *Chrysomela scalaris*, Lec. This attractive beetle occurs commonly on the linden in Ontario, and attacks the foliage both in the mature and larval stages. The perfect beetles are beautiful insects, with their silvery wing-covers spotted with green. The larvae are thick bodied, white, with a lateral row of black dots.

6. *Chrysomela pnirsa*, Stal. Mr. Harrington tells me that he has twice taken this handsome species upon the leaves of basswood near Hull, Que., in July—three specimens in all. Dr. Fletcher also has specimens taken at Billings Bridge, Ont.

7. *Odontota rubra*, Web. This is a common insect on basswood, but it has never been the cause of noticeable injury in Canada.

8. *Odontota rosea*, Web., is also a common species on the linden, but like the preceding does not do any particular injury. The larvae, which are of a yellowish white colour, when hatched eat their way into the interior of the leaf, feeding on the soft tissues within, the skin being left entire.

9. *Brachys aerosa*, Melsh. This pretty little buprestid has been reared several times by Dr. Fletcher, from blister mines in the leaves of basswood, the beetles emerging in May.

10. The Strawberry Weevil, *Anthonomus signatus*, Say. This common enemy of the strawberry is recorded by Dr. Hamilton, (Can. Ent. XXIV., p. 41) as eating the leaves and blossoms of *Tilia*. This weevil does considerable harm to strawberry plants in Canada. Just before the flowers expand they are severed from their stems by the female weevil, which pierces the buds and lays one white egg in each, which afterwards hatches into a white grub, passing all its stages inside the fallen bud, eating out the centre and forming a round cocoon or pupa case of the frass, within which it turns to the beetle. (Fletcher, Rep. Dom. Exp. Farms 1890). At Ottawa we have noticed that some insect has been at work within the seeds of the basswood, but we have not as yet found any actual specimens. It is possible that the species may prove to be *A. signatus*, but this, of course, is merely conjecture.

ORDER LEPIDOPTERA.

11. Forest Tent Caterpillar, *Malacosoma disstria*, Hbn., is one of the most important of our foliage-eating forest insects. When abundant it causes widespread destruction, attacking the basswood as well as many other trees.

12. Apple-tree Tent Caterpillar, *Malacosoma americana*, Harr., is also injurious to forest as well as orchard trees, although it is more widely known as destructive to the latter. During seasons when this and the preceding species are abundant, larvae of both kinds may be found feeding together and living in the same nests. In the Annual Report for 1893, Mr. Harrington reported that *C. americana*, Harr, and *C. disstria* Hbn "stripped bare many acres of aspen poplar, basswood and maple groves" in the Ottawa district. The life-histories of both these tent caterpillars, as well as the remedies, are well known, and have been mentioned many times in the reports of our Society.

13. The Fall Cankerworm, *Alsophila pometaria*, Harr. These larvae have been very destructive to the foliage of basswood, at Ottawa, every spring for some years. During the past season they were particularly abundant defoliating, and making unsightly, trees of many kinds, the linden and elm coming in for more than their share of injury. These caterpillars have long been known to the practical entomologist, and many experiments have been conducted to eradicate them. The remedies now recommended against cankerworms are, t

spray the trees with Paris green, or some other arsenical poison, and to band them with a mechanical protector, some kinds of which have been used with success. Bands of sticky substances may also be placed around the trees to be protected, to prevent the female moths which are wingless, from climbing up the trees to deposit their eggs.

14. The Spring Cankerworm, *Paleacrita vernata*, Peck., hatches from the egg at the same time as the preceding species. Both these cankerworms are similar in appearance, and have the same habits. The Fall Cankerworm moth emerges in the fall, and the Spring Cankerworm moth, in the spring. The caterpillars are slender loopers about an inch and a quarter in length, and vary in colour from greenish-yellow to dusky, or even dark brown, marked with black.

15. The Lime-tree Winter moth, *Erannis* (*Hybernia*) *tiliaria* Harris. This is another common insect, the larvae of which are often abundant in Ontario and Quebec, some seasons doing considerable injury. The caterpillar is one which has the power of travelling very quickly from one point to another, and consequently when the species is numerous the injury is widespread. These larvae when full grown are about an inch and a quarter in length and in general appearance are bright yellow loopers with a dull red head, and many longitudinal black lines on the body, the under side of which is paler. (Fig. 13.) They reach maturity towards the end of June and then descend and enter the ground for pupation, the moths appearing in October and November. The female moth is wingless, and the habits of the species in general are similar to those of the Cankerworm, so the same remedial treatments may be adopted.

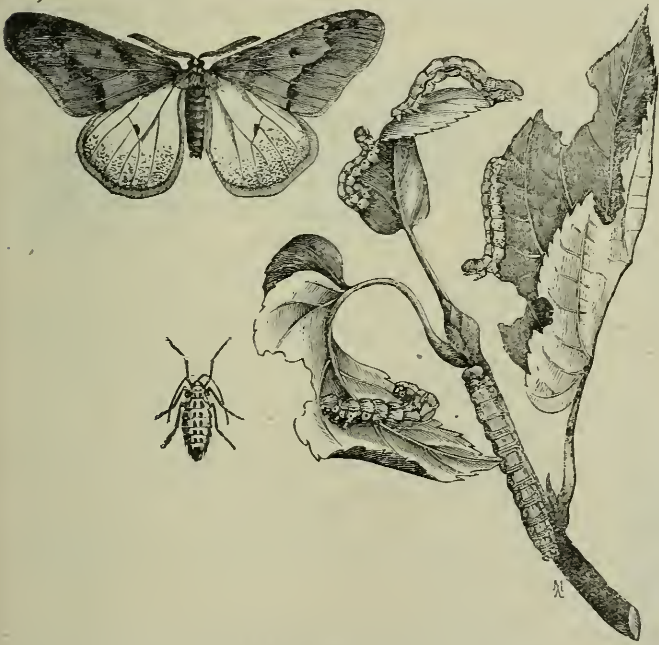

Fig. 13. Lime-tree Winter Moth ; Male and female moths, and caterpillars.

16. The Yellow-necked Apple-tree Caterpillar, *Datana ministra*, Drury. Colonies of these larvae are occasionally met with on basswood trees. At Ottawa on the 25 August we have found the young larvae just after they have hatched, the moths appearing the following year. These caterpillars are best known from the damage they do to the foliage of the apple. They are interesting in view of their feeding habits and the curious position they assume when at rest. When mature they are about an inch and a half in length. The body is black covered sparsely with long white hairs, and is marked longitudinally with four greenish-yellow stripes on each side. The head is shining black, and the body just behind the head bears a conspicuous yellow shield from which the caterpillar derives its common name.

17. The Basswood Leaf-roller, *Pantographa limata*, G. & R. A common sight some years where basswood trees are numerous, is single leaves cut across from near the middle, and the end portion rolled up like a tube. The insect which causes this is a pyralid larva, which

fastens the portion of the leaf as it rolls it with threads of silk. It is bright green, about an inch in length, with a black head and shield of the same colour on the back close to the head. The body is spindle shaped and bears brownish warts. Like other pyralid larvæ, it is very active in its movements when disturbed. The moths fly at Ottawa late in June, and again in August.

18. *Xylina Bethunei*, G. & R. The caterpillars of this noctuid moth were quite plentiful near Ottawa, on the 5th June, 1903, attacking the foliage of basswood. They were at that time nearly full grown, about an inch and a half long, of a pale greenish colour, with a yellowish dorsal stripe, and had white tubercles. Specimens collected pupated shortly after that date, the moths emerging from the 17th to 26th September.

19. *Ennomos alniaria*, Linn. Dr. Packard states that this common larva was found on the linden by Dr. Harris in August and September. Other writers also refer to the larvæ as feeding on basswood.

20. *Catocala cerogama*, Gn. On the 31st May, 1901, Dr. Fletcher and the writer found eleven full grown larvæ of this *Catocala* on a large basswood tree near the Experimental Farm. These caterpillars were over two inches in length, and four of them were greenish, while the remainder were grayish. They all spun their cocoons in about a week's time, and gave us the perfect moths about the middle of July.

21. *Automeris (Hyperchiria) io*, Fab. Nearly full grown larvæ of this well known species were beaten from basswood by the writer on the 15th August last at Meech lake, near Ottawa. Mr. Winn tells me that these caterpillars were very abundant on St. Helen's Island, near Montreal, during August, 1901. This insect is well known in the mature form, and is common "at light" in many parts of eastern Canada. The larvæ, however, are seldom abundant enough to be considered very injurious. They have the habit, particularly when in their earlier stages, of feeding in serried ranks, and on this account attract attention when noticed. The mature caterpillar (Fig. 14) is a beautiful creature, pale green, with tubercles bearing stiff spines of the same colour. Along each side of the body on the abdominal segments is a bright reddish band broadly edged with white below. The spines from the tubercles are very sharp and possess strong urticating properties, so are capable of giving a painful sting if the caterpillar is handled at all carelessly.

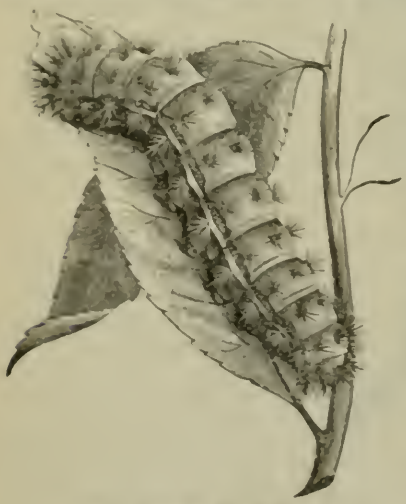

Fig. 14. Io caterpillar (full grown).

22. The Brown-tail moth, *Euproctis chrysorrhœa*, L. This is a European insect which was accidently introduced into the State of Massachusetts some years previous to 1897—the season its depredations were first brought to public notice. It is thought that the insect was brought to that locality, on imported roses, from Holland or France. Since 1897 the Brown-tail moth has done an enormous amount of injury, its favourite food plant being the pear, but among the many other trees and shrubs which it has attacked, considerable damage has been done to the foliage of basswood trees, both *Tilia Americana*, and *T. Europæa*. There is only one record of the insect having been taken in Canada, viz. a single specimen of the moth at St. John, N. B. last year by Mr. W. McIntosh. A valuable account of the introduction into Massachusetts and also of

the spread of the insect, with life history, remedies, etc., has lately been published by Dr. C. H. Fernald, and Mr. A. H. Kirkland.

23. The Fall Web-worm, *Hyphantria textor*, Harr. This insect is also a very general feeder, and when the larvæ are numerous, the basswood suffers almost equally as much as do many other trees attacked by this well known pest. This insect, as its common name implies, makes unsightly webs, at the tips of the branches, but as it occurs rather late in the season its injury is not so serious as it would be if the caterpillars appeared earlier. When mature the larva is rather over an inch in length and varies much in colour, some specimens being pale yellowish, or greenish, others much darker almost a bluish black. An easy way of dealing with this pest is to cut off the webs as soon as they are noticed and destroy the contained caterpillars by crushing them under foot.

24. The White-marked Tussock Moth, *Hemerocampa leucostigma* S & A. is one of the best known enemies of shade trees. In Canada probably the tree which has suffered most from the larva of this species is the horse-chestnut, but when the insect is abundant it attacks basswood, as well as other trees. In Toronto for many years the species has been very destructive to shade trees. It can, however, be controlled easily by spraying with arsenical poisons, and by the collection of the conspicuous egg masses during the winter. The caterpillar is about an inch and a quarter in length when full grown, with a chestnut red head, just behind which is a conspicuous coral red mark, and two small elevations of the same colour posteriorly. On the back there are four white brush-like tufts, two long black plumes near the head and one at the anal end. The body also bears slender hairs, and a wide black band down the centre of the back, and a still wider band not so black on each side; between these bands the colour is golden yellow, and the skin just below the spiracles is also yellow.

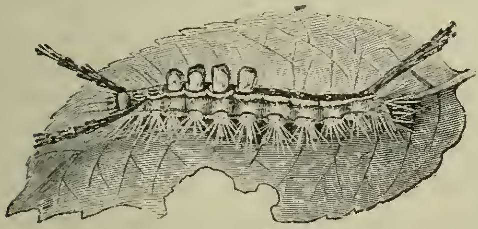
Fig. 15. Tussock Caterpillar.

25. The Red Tussock Moth, also called the Old Tussock Moth, *Notolophus antiqua*, L. Larvae of this species in all stages of development have been found feeding on the foliage of basswood, but while common the caterpillars never occur in sufficient numbers to do noticeable injury. The larva of this Tussock Moths differs from that of the preceding species in being much less gaily coloured and lacks the bright red head. It also has an additional pair of black pencils arising from the sides of the second abdominal segment.

26. The Polyphemus Emperor Moth, or American Silkworm Moth, *Telea polyphemus*, Cram. The larva of this common Emperor Moth has been occasionally found on the basswood at Ottawa. During the past season the writer found a single egg of this species on a linden leaf, and reared the larva to full growth.

27. The Checkered Tussock Moth, *Halisidota tessellaris*, S. & A. At Ottawa the basswood seems to be one of the favourite food plants of the caterpillars of this arctiid moth. When beating the foliage for larvae, this species has been one of the commonest we have collected, but the caterpillars have never been found in any great numbers, so the damage has not been very serious. The full grown larva is over an inch in length with a black head, the body covered with hairs of a delicate buff-yellow colour, and bears four dorsal blackish pencils, or conspicuous tufts, in front, two pairs of shorter lateral white tufts, and a pair of whitish tufts near the end of the body.

28. The Spotted Tussock Moth, *Halisidota maculata*, Harr. also has been frequently found on basswood at Ottawa The caterpillar is larger, and quite different from the preceding species, the body being black, covered with tufts of bright yellow and black hairs, the black tufts being on the four anterior and three posterior segments, and the yellow tufts on the remaining segments. The latter are centred down the middle of the back with a row of black tufts

29 The Hickory Tussock Moth, *Halisidota caryæ*, Harr. Caterpillars of this species have been found feeding on linden in July, August and early September. This larva has a black head and the body is clothed with dense tufts of white hairs, with a ridge of black hairs down the centre of the back, and two pairs of long black pencils on the first and seventh abdominal segments

This and the above two species of *Halisidota* larvae become mature in the fall of the year and spin oblong-oval cocoons, composed of the hairs from the body interwoven with some silk. The moths appear the following June.

30. *Schizura ipomoeæ*, Dbl. Specimens of the larva of this interesting notodontian were rather common at Meech Lake, Que. the past season. On the 15th August Mr C. H. Young and the writer collected a number of examples by beating the foliage of basswood; by the 22nd Sept. the specimens were full grown.

31. The Gypsy Moth, *Porthetria dispar*, L. In the State of Massachusetts this insect has been the cause of widespread destruction, and the most extensive experiments ever attempted in the science of applied entomology, amounting in cost to millions of dollars, have been carefully conducted by such eminent entomologists as Fernald, Forbush, and Kirkland The caterpillar of this European insect has a wide range of food plants, among which is the basswood. Fortunately the insect does not occur in Canada, it being confined to Massachusetts and portions of adjoining States. In an interesting paper by Mr. Kirkland entitled "The Shade-tree Insect Problem," 1901, the following paragraph on the life history of the Gypsy Moth appears: "The parent moth lays its eggs to the number of five hundred to one thousand, in a yellow, hairy covered mass, on tree trunks, fences, buildings, walls, etc. The eggs hatch early the following May, and the caterpillars swarm abroad in search of food. They devour both buds and leaves, and sometimes even attack the tender bark of the twigs As soon as the foliage develops they give it their undivided attention, feeding chiefly by day. When about one-third grown their feeding habits change, and the insects seek shelter by day and feed almost entirely by night. The full grown caterpillar is sparingly covered with stout hairs and has a double row of tubercles along the back. On the five anterior segments these tubercles are blue; on the six posterior, dark red. The caterpillars pupate in masses in any convenient sheltered locality, particularly at the bases of large branches, and in about a fortnight the moths emerge."

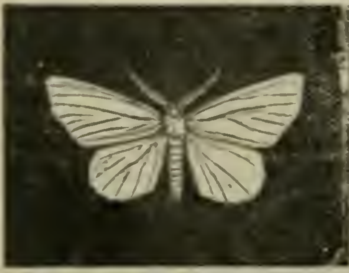

Fig 16. Snow-white Linden Moth.

32. The Snow-white Linden Moth, *Ennomos subsignarius*, Hbn (Fig. 16). The caterpillar of this geometrid moth has been recorded by different writers as destructive to the linden. Packard, in his *Insects Injurious to Forest and Shade Trees*, treats of it under the name of the Elm Span worm. Full grown, or nearly so, larvae have been frequently collected at Ottawa from basswood. When mature they are over an inch in length, of a brown colour, with a large head which is red, as is also the posterior segment of the body. The caterpillar reaches maturity in June, and the moths appear during July and early August

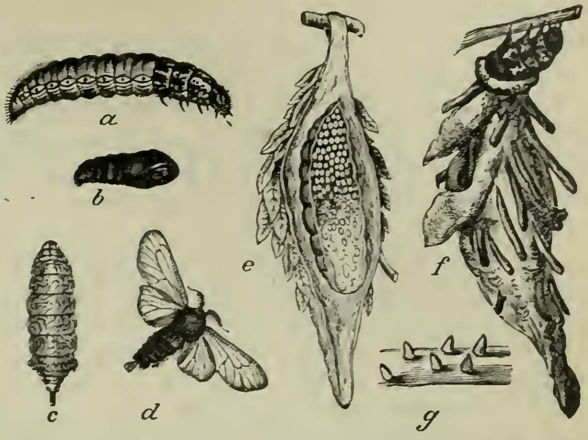

Fig. 17. The Bag-worm: *a*, caterpillar removed from the bag; *b*, male chrysalis; *c*, wingless and legless female moth; *d*, male moth: *e*, bag cut open showing female chrysalis and eggs; *f*, caterpillar in the bag: *g*, cones made by young larvæ.

33. The Bag-worm, *Thyridopteryx ephemeræformis*, Haw. (Fig. 17.) Although we have no actual record of its capture, or presence, this insect doubtless occurs in Canada. In some of the States adjoining the Dominion it has been very destructive to a great many kinds of fruit and shade trees, among which is recorded the linden. The habits of this insect are remarkable. The caterpillar, as its name suggests, makes a bag composed of twigs or bits of leaves, within which it lives. The female moth is wingless, and soon after emerging commences to fill the bag which she made when a larva with eggs. These bags containing the eggs hang on the trees all winter, the young caterpillars hatching the following spring.

34. The Oblique-banded Leaf-roller, *Archips rosaceana*, Harr. The larvæ of this common and widely distributed tortricine moth are very general feeders, and we have found them on a great variety of trees and shrubs at Ottawa, the basswood being among the number. During the past season they were particularly abundant on the apple, but did not do any serious damage.

35. *Paraphia subatomaria*, Wood. On the 14th April last a single larva of this insect with some apple leaves was received at the Division of Entomology from Mr. R. J. Messenger, of Bridgetown, N.S. This caterpillar would not, however, eat apple in confinement, and after almost everything else had been tried we succeeded in getting it to eat basswood, on which food we reared it to the perfect insect, the moth emerging on the 8th June.

36. *Paonias excæcatus*, S. & A. On several occasions we have collected in August, at Ottawa, the larva of this hawk moth by beating the foliage.

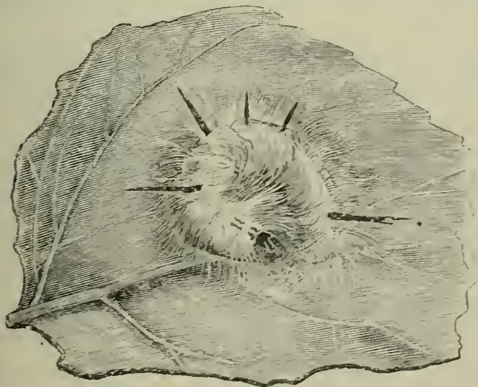

Fig. 18. Apatela caterpillar.

37. *Apatela Americana*, Harr. The caterpillars of this noctuid have also been beaten from basswood (Aug. 25) by the writer. The larvæ feed on the foliage of a number of other trees (Fig. 18).

38. *Ania limbata*, Haworth. A single larva of this geometrid moth was found by Mr. Harrington feeding on the linden at Ottawa, and given to the writer, who bred it to the perfect insect.

39. *Coleophora tiliæfoliella*, Clem. In Packard's Forest Insects it is stated that the larva of this species feeds on the leaves of linden from the beginning to the latter part of May. The larva is said to be dark, dull brown, the dorsal plates and head black. We have never collected the insect in Ontario.

40. *Lithocolletis lucetiella*, Clem. The larvæ of this beautiful little moth have been found quite commonly on the basswood in some districts.

41 *Lithocolletis tiliacella*, Chambers. This is another miner in the leaves. We have found the species rather plentiful at Ottawa some seasons. Regarding this and the preceding species, Mr. August Busck, of the Department of Agriculture, Washington, tells me, in correspondence, that these two small white and golden moths are much alike, to the uninitiated, in their adult stage, but can be easily recognized by anyone by their different mines. *Lucetiella* makes an inconspicuous small, white, tentiform mine between two ribs, on the underside of the leaf, while *tiliacella* makes a larger, showy, nearly circular white, brown-dotted blotchmine on the upper side of the leaf.

42. *Parorgyia Clintonii*, G. & R. Specimens of the larva of this moth have been found feeding on basswood by Mr. C. H. Young, at Meech Lake, Que. The larvæ were full grown in July, and moths from collected material emerged the end of August

43. *Heterocampa manteo*, Dbl. Full grown larvæ of this notodontian have also been found on the linden at Meech Lake, Que. by Mr. Young. Caterpillars collected the end of August produced moths the later half of the following June. Some of the larvæ gathered were parasitized by the large ichneumonid, *Ophion bilineatus.*

44. *Symmerista albifrons*, S. & A. The caterpillars of this moth have been recorded by Dr. Fletcher as having appeared in great numbers at Ottawa in 1884, being particularly injurious to oaks and maples. Larvæ about half grown were found feeding on basswood on the 15th August, near Ottawa, by the writer.

45. *Tortricidia testacea*, Pack. A larva of this species was found feeding on the foliage by Mr. Young, and another specimen by the writer, the moths emerging in June.

46. *Euclea querceti*, H.-S. Mr. Young tells me that larvæ of this pretty little moth were very common on basswood at Meech Lake, Que., the past season. Full grown caterpillars were collected in September. The moth appears in July, specimens having been collected on the 12th, 14th and 27th.

47. The Pyramidal Grape-vine Caterpillar, *Pyrophila pyramidoides*, Gn. A few examples of nearly full grown larvæ of this common insect, have been occasionally beaten from basswood, about the middle of June, at Ottawa. The caterpillar is frequently destructive to grape, but while partial to that plant, it also feeds on maple, plum, poplar, gooseberry, etc.

48. *Metrocampa prægrandaria*, Gn. This species occurs throughout Canada, and in some districts is fairly abundant. We have found the larvæ on basswood at Ottawa, the moths emerging early in September. The imagos fly at Ottawa the latter half of June and again late in August.

49. *Cenopis Pettitana*, Rob. On the 31st May, 1899, the writer collected the larva of this small tortricine moth on the foliage of basswood. The caterpillar changed to pupa on the 7th June, and the moth emerged on the 16th June.

Other lepidopterous insects which have been recorded as feeding on basswood, and all of which occur in Canada, are as follows : —

50. *Papilio turnus*, L.
51. *Polygonia interrogationis*, Fab.
52. *Polygonia comma*, Harr.
53. *Basilarchia arthemis*, L.
54. *Euvanessa antiopa*, L.
55. *Ceratomia amyntor*, Geyer.
56. *Phobetron pithecium*, S. & A.
57. *Samia cecropia*, L
58. *Basilona imperialis*, Dru.
59. *Panthea furcillo*, Pack.
60. *Apatela hastulifera*, S. & A.
61. *Apatela morula*, Grt.
62. *Apatela luteicoma*, G. & R
63. *Datana Angusii*, G. & R.
64. *Datana Drexelii*, Hy. Edw.
65. *Lithacodes fasciola*, H.-S.

During our study of the insects which feed upon the foliage, we have collected at least a dozen more species of lepidopterous larvæ which we have been unsuccessful in rearing to the imagos The majority of these were small species.

Order HYMENOPTERA.

66. The Linden slug, *Selandria tiliæ*, Nort, a common species on basswood, occurs throughout Ontario.

67. The Willow Sawfly, *Cimbex Americana*, Leach. This is a common species throughout Ontario, the larva always attracting attention when noticed. It feeds chiefly on willow and elm, but Harrington records it as feeding on linden at Ottawa. (Rep. Ent. Soc..XV. 65).

Order DIPTERA.

68. *Cecidomyia verrucicola*, O. S. This common gall gnat is recorded by Smith as occurring frequently at New Brunswick and elsewhere in the State of New Jersey, on the leaves of linden.

Order ACARINA.

Some of the Phytoptidæ, the family to which the well known Pear-leaf Blister-mite belongs, commonly called gall-mites produce galls of various sizes and shapes upon the leaves of the plants they infest.

69. The Linden gall-mite, *Phytoptus abnormis*, Garman. This species is recorded by H. Garman in Forbes's 1st Annual Report as producing galls on the leaves of American linden, at Bloomington, Ill.

70. The Clover mite, *Bryobia pratensis*, Garman. Eggs of the clover mite have been found at Ottawa on basswood, by Dr. Fletcher, but no injury has been recorded.

OCCURRING ON THE BARK.

The insects which occur on the bark are all homopterous species, and obtain their food by means of their *beaks*, through which they suck up the juices.

71. The Maple-tree Scale-insect, *Pulvinaria innumerabilis*, Rathvon. In Ontario this species has probably been the most abundant of those which occur on the bark. The maple is the tree upon which it is most frequently found, but it has an extensive range of food-plants, among which is the basswood. In the City of London, the past season this insect was very conspicuous, owing to the white cottony mass which surrounds the eggs. Dr. Bethune refers to this infestation in London in another part of this Report.

72. The Oyster-shell Bark-louse, *Lepidosaphes ulmi* L. = *Mytilaspis pomorum*, Bouche. This scale insect is particularly destructive to the apple tree, and is one of the commonest of the well known insect pests of the orchard. The species, however, has been found on linden as well as on a great many other trees and shrubs. An ordinary lime wash (1 ℔ fresh lime in 1 gallon of water) sprayed on to the trees in early winter, and again soon after the first application is thoroughly dry, has been found very effective at the Central Experimental Farm. This material flakes off the trees during the winter and takes with it large numbers of the scales. This treatment should be followed in the spring, when the young plant lice are hatching, with a spray of kerosene emulsion, whale oil soap, or tobacco and soap solution.

73. The San Jose Scale, *Aspidiotus perniciosus*, Comst. This the most deadly of all fruit insects also has a wide range of food plants, including the basswood. In Canada the insect is fortunately confined to certain areas in Ontario, but in those areas it has been the cause of terrible destruction to peach, apple, plum, and pear trees, and has been found in numbers on other trees and bushes adjacent to infested orchards.

74 The Putnam Scale, *Aspidiotus ancylus*, Putn. This scale is also recorded as occurring on linden. In Canada the species has several food plants, and, while not abundant enough to be considered injurious, is not uncommon in Ontario.

75. The European Fruit Scale, *Aspidiotus ostreaeformis*, Curtis. This species also has a wide range of food plants, and among other trees has been found on the basswood. It occurs in several places in western Ontario.

76. *Pulvinaria tiliae*, King & Ckll. This species occurs in western Ontario, but is not a very common insect.

77. *Eulecanium tulipiferae*, Cook. This insect is the same as *Lecanium tiliae*. It has been found occasionally on basswood at Ottawa, but not in any numbers.

BORING INTO THE WOOD.

The insects which bore into the wood of the linden belong chiefly to the Order Coleoptera, or beetles. They do not as a rule attack healthy trees ; it is when these are weakened in some way that they are attacked by the grubs of boring beetles. The following borers are known to occur in the wood of the basswood.

ORDER COLEOPTERA.

78. The Linden Borer, *Saperda vestita*, Say. This is the most destructive borer of the basswood. It is a common species and has a wide distribution. The grubs are white, rather slender, and when mature slightly over an inch in length. The beetles emerge at Ottawa late in May and during the early part of June. On the 4th June 1902, we found mature larvæ, and also pupæ in a tree in the arboretum of the Central Experimental Farm, which had been killed by the attacks of this borer. Beetles which had just emerged were also collected.

79. The Flat-headed Apple-borer, *Chrysobothris femorata*, Fab. (Fig. 19.) Although the larva of this insect has been called the Flat-headed Apple-borer, it does not by any means confine its attacks to that tree. Larvæ have been found in linden as well as in many other orchard and forest trees. The species is common and widespread. The larvæ are pale yellow, flat-headed grubs. The eggs are laid by the female beetle in the cracks and crevices of the bark, and the young larva upon hatching eats its way through the bark and feeds on the sap-wood within. As it becomes mature it usually enters the solid wood, and when about to change to a pupa, bores its way back again to the outside but not quite through the bark. The female beetles in Canada resort to the trees for egg laying during the month of June, and at that time the trunks and larger branches of the trees to be protected should be painted with an alkaline wash. Dr. Fletcher recommends : soft soap reduced to the consistency of thick paint by the addition of a strong solution of washing soda in water. If applied with a brush on the morning of a warm day, this will dry in a few hours and form a tenacious coating not easily dissolved by rain. If one pint of crude carbolic acid be added to the gallon of wash it will make it more effective.

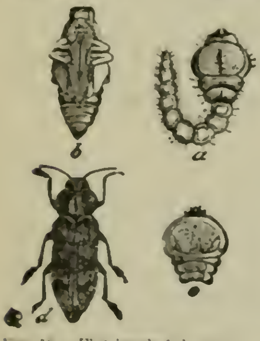

Fig. 19. Flat-headed borer: a, grub; b, pupa; c, head of borer; d, beetle.

80. The Sugar-maple Borer, *Plagionotus speciosus*, Say (Fig. 20) The only reference we know of to this borer as a linden insect appears in *Country Gentleman* for August 8, 1895. In this issue Dr. Lintner spoke of injury to sugar maples and a linden tree as probably having been caused by the larva of this beetle. In his 1885 Report, Dr. Fletcher mentioned that he had received several specimens of this handsome wasp-like beetle, with the statement that it had done considerable damage to shade trees. It is not an uncommon species in Ontario, but we do not know of any instances of the larvæ having injured basswood in Canada.

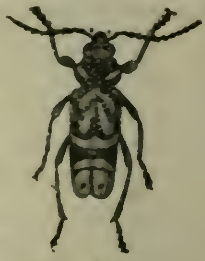

Fig. 20. Sugar-maple borer.

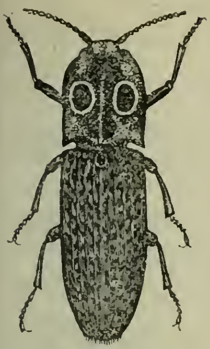

Fig. 21. Alaus oculatus.

81. *Alaus oculatus*, L. (Fig. 21.) This elater is found not uncommonly in many parts of the Dominion. It is a striking species. The larvæ feed in decaying wood.

82. *Melanotus communis*, Gyll. This common elater is recorded by Townsend as occurring "under the bark."

83. *Elater nigricollis*, Hbst. Mr. R. J. Crew, of Toronto, tells me that he has found specimens of this beetle in a dead basswood stump, Nov. 11, 1901.

84. *Parandra brunnea*, Fabr. Townsend records having found specimens of this insect under the loose bark of basswood. The larvæ breed in a variety of deciduous and coniferous trees.

85. *Prionus brevicornis*, Fabr. This handsome cerambicid is said to be a borer in the basswood.

86. *Neoclytus erythrocephalus*, Fabr. This beetle is mentioned in Dr. E. P. Felt's report as State Entomologist of New York for 1899, as having been observed ovipositing on a dying tree, *Tilia americana*.

87. *Cyrtophorus verrucosus*, Oliv. is recorded by some writers as living on linden as well as on the wood of some other trees. The species is common in Ontario.

88. *Hoplosia nubila*, Lec. In Packard's Forest Insects it is stated that "according to Le Conté this longicorn lives in the basswood" A specimen of this species was reared at Ottawa from boughs of basswood brought into the office during the winter of 1900. The full grown beetle, which is not unlike a diminutive specimen of *Anthophylax attenuatus*, Hald., emerged the following spring.

89. *Saperda tridentata*, Oliv., and

90. *Saperda lateralis*, Fab., are both stated by Lugger to "occur upon a variety of forest trees such as linden, poplar and others." Both these species are found in Canada.

91. *Xyletinus lugubris*. Lec A single specimen of this small beetle was reared at Ottawa from a dead basswood branch brought into the office during the winter.

92. *Eupsalis minuta*, Dru. This is a species which bores under the bark of several different trees. Townsend records having found it in basswood, and the insect has also been collected at Ottawa.

93 *Stenoscelis brevis*, Boh. This insect has been included among those which have been found in the decaying wood. We have reared the species from dead boughs brought into the office in winter. Mr. Harrington has bred it from oak, hickory, maple and poplar.

ORDER LEPIDOPTERA.

94. The Leopard Moth, *Zeuzera pyrina*, L. This is an introduced insect which occurs destructively in some of the eastern cities and their immediate vicinity, in the United States, particularly New York and Jersey City. I do not know of any specimens having been found in Canada. This borer is a very general feeder, having been known to attack basswood, maple, elm, hickor and other trees.

INSECTS INJURIOUS TO ONTARIO CROPS IN 1903.

BY DR. JAMES FLETCHER, DOMINION ENTOMOLOGIST.

The season of 1903, like the preceding one, was of an unusual character throughout the Province. Up to the middle of June, an exceptional drought prevailed in most districts; this was followed by copious rains and a luxuriant growth of all vegetation till the end of the season. These conditions had a marked influence on the prevalence of insects injurious to crops. During the spring months Cutworms were troublesome in a few localities, but there was no complaint of widespread injury. Wireworms and White Grubs were mentioned in several places.

There was much enquiry for instructions on the best way to treat seed peas to destroy the Pea Weevil. This was a natural outcome of the vigorous campaign instituted by the members of our Society subsequent to the conference held at the last annual meeting. Seed merchants and farmers, I am convinced, did more in 1903 to control this pest than has been done previously for many years, and reports at the end of the season indicate a more satisfactory state of affairs as to the abundance of the Pea Weevil. In the Ontario crop report for October, Prof. James gives the crop of peas for 1903 as 8,924,650 bushels, as against 7,664,679 for 1902, an increase of one million and a quarter bushels. As a result of the spring drought, all hay and fodder plants were slow in developing, and there was much injury on old meadows from "Silver-top," which was especially noticeable in fields of Timothy. This injury seems to be due to two causes,—the attacks of a minute insect, a member of the Thripidæ, *Limothrips poaphagus*, of Comstock, and various small leaf-hoppers and true bugs which puncture the stem and suck the sap from the lower part of the top joint, thus causing the head to wither and turn white before maturity. In addition to these and in a lesser degree, the stems of some of the larger grasses are occasionally attacked by the Wheat-stem Maggot (*Meromyza Americana*, Fitch).

Some of the striking features of the year were the marked decrease in the injuries of the Hessian Fly, and in most places of the Tent Caterpillar and of the Squash Bug. The Codling Moth in the eastern part of the province gave very little trouble; and, west of Toronto, where there are two broods, the first brood was not nearly so injurious as usual; although later in the season the caterpillars appeared in some numbers, the apple and pear crops were freer than usual of this pest. This being the case, it is most important that fruit growers should now more than ever practise the joint remedy of spraying in the early spring and banding the trees in the autumn, not forgetting that examining these bands and destroying the contained larvæ is of even more importance than putting the bands on the trees. The enormous crop of plums this year made the attacks of the Plum Curculio for the most part insignificant. In some places, however, the injury was extreme, and this was particularly the case where spraying had not been well attended to. The Fall Web worm (*Hyphantria textor*, Harris) was noticeably on the increase, and the same may be said of the White-marked Tussock Moth [*Hemerocampa* (Orgyia *leucostigma*, S. & A.]. It is most important that fruit growers and municipal bodies should attend to both of these insects without further delay. The Birch Skeletonizer (*Bucculatrix* (*Canadensisella*, Cham.) appeared again in some numbers in Central Ontario, but was not nearly such a serious pest as it has been for the past two years, nor were its injuries this year augmented to any serious extent by the work of a large aphis (*Callipterus mucidus*, Fitch) and a leaf-hopper (*Empoasca smaragdula*, Fall.) which last year were very abundant. Attacked trees, this year, held many of their leaves till the end of the autumn. Experiments in spraying trees with a whale-oil soap wash containing Paris green were successful, and this is probably the best remedy to apply on ornamental trees, should the insect again increase abnormally. The Horn Fly which some years ago did such serious injury among dairy herds has this year been decidedly more troublesome than has been the case for several years, and it is worth recording that I found it in several places in British Columbia, even on Vancouver Island. It has therefore now spread right across the continent. The remedy which has given the best results in my experience, is smearing the animals lightly on such parts as are most attacked, with a dressing of one pound of pine tar in five pounds of lard. Up to the present year the application we have used has only been of half this strength, viz.: 1 lb. of tar in 10 lbs. of lard, but decidedly better results have been secured by using the stronger mixture.

Cereal Crops.

Cereal crops throughout the Province were little injured by insects during 1903. The only insect which drew particular attention from farmers was the Grain Aphis (*Nectarophora granaria*, Kirby), and, notwithstanding that this plant-louse was reported from a great many localities during the month of August, little real harm was done to the crop. The usual parasites, *Aphidius* and various *Syrphus* flies, quickly appeared and destroyed the infesting plant-lice. The Pea Weevil, as already stated, was not so abundant as usual in most places; but, owing to the large number of farmers who have given up the cultivation of this important cereal, it is rather difficult to decide as to the actual amount of harm done. The acreage this year put in to peas was much less than for many years, but the average yield per acre was higher. Prof. Lochhead tells me that in certain districts the weevils were very numerous and that, in localities in the southwest of Ontario where many peas are still grown, one of his correspondents in the County of Kent reported that about one half of the peas contained weevils in the larval and pupal state at the end of August, and that the insect was still abundant and destructive in the Counties of Dufferin and Halton.

The Hessian Fly was decidedly less destructive in all parts of the Province, and there were only one or two instances reported where it had done noticeable harm. This is, of course, to a certain extent due to the increase of its natural parasites; but, undoubtedly, farmers throughout the districts where fall wheat is grown, are now systematically sowing later than formerly, that is, they are waiting until after the middle of September instead of trying to get in their seed in by the first of the month.

An injury to oats which caused some loss and was the subject of considerable enquiry was the blighting of the lower flowers in the panicles of late oats. The florets turned white and no grain was produced. This was due, it believed, to the attacks of a *Thrips* (Fig. 22) and agrees very closely with the injury done by two species of *Thrips* which attack small grains in Europe. Prof. Lindeman, who has studied these small insects and has published an important article on those living on cereals in Russia, thinks that "only two species are of agricultural importance. *Thrips secalina* (possibly *Limothrips cerealium*, Halid.) occurs on the ears of rye in June and then, later, in the second brood, on summer wheat and barley. The injury of this species, however, is less than that of *Phlœothrips frumentaria*, Bd. This caused great damage by puncturing the ovaries of rye, wheat, barley and timothy." The insects hibernate in the adult form, and this suggests the possibility of controlling them by deep fall-ploughing and the burning over of stubbles. This injury occurred not only in Ontario but eastward into the Province of Quebec and was reported as far west as Manitoba.

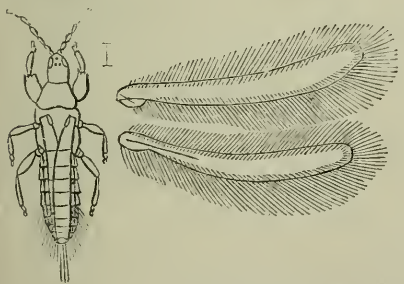

Fig. 22. A Thrips and its wings, greatly magnified.

Fodder Crops.

Owing to the exceptional drought of early spring all grass crops were very much delayed in development, and there was until the middle of June every appearance of a serious shortage

At that time, the whole country and all vegetation was as dry and burnt up, even the foliage of forest trees, as in a dry September in ordinary years. On the 11th June in the Ottawa district, however, regular rains began, and at the end of the season hay crops were almost up to the average, and pastures in excellent condition. Peas grown for fodder, either alone or in mixed crops, were somewhat injured in the western part of the Province by the Pea Aphis (Fig. 23). This was most noticed on the Grass Pea and Field Peas which were held back from maturing by the cool damp summer.

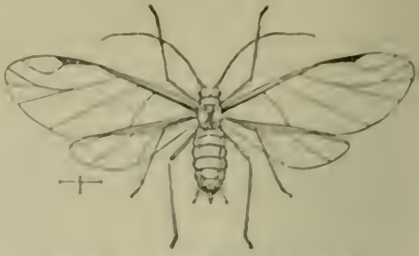

Fig. 23.—Pea Aphis, greatly magnified.

The Clover-seed Midge (*Cecidomyia leguminicola*, Lintn.) was the most destructive enemy of fodder crops this year and occurred pretty well throughout the Province. Where clover was grown for seed, except in Simcoe county and northern localities, very little was reaped, and, even where the clover was grown for hay, the heads were distorted and poorly developed. Those growers who followed the recommendations which have been made, reaped far better crops than those who were less provident. The remedies consist of feeding off with stock, or cutting and drawing from the field the first crop of clover, before the 20th of June, which is the time when the larvæ of the first brood mature and leave the clover heads to enter the ground and complete their changes. The perfect insects which lay the eggs for the second brood, appear just as the second crop of clover is coming into flower, when they lay their eggs amongst the forming blossoms; the small red maggots then penetrate the pod and destroy the seed. Just before the time for the seed to ripen, these leave the clover and enter the ground, where they pass the winter to emerge again the following June as tiny gnats, which lay their eggs in the clover heads before the flowers open. By the feeding off or cutting of the first crop of clover, the whole of the first brood of larvæ in a field is destroyed before they leave the heads, and the second crop from which the seed is reaped, is comparatively free of attack. At the present time, co-operation among growers in adopting this well tried method is a manifest necessity, if there is any hope of growing clover seed for the market in these districts best suited to its production.

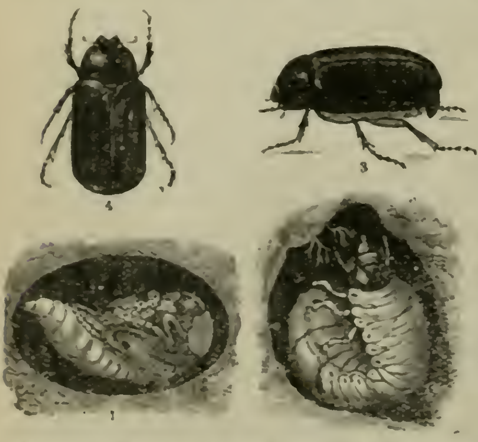

Fig. 24.—White Grubs: 1, pupa; 2, larva; 3 and 4, beetles.

White Grubs, the larvæ of various species of May Beetles (Fig. 24.), did some damage in fields of fodder corn and in hay meadows, and two reports were received of serious injury to lawns, where the grubs occurred in such numbers that the sod could be rolled up like a carpet, the whole of the roots having been eaten away. In the case of meadows and field crops, little can be done at the time the insects are noticed; but, on lawns, if the injury has not gone too far, copious waterings with kerosene emulsion are effective. As a rule, in a short time the grass will recover; but it is always advisable to help it with some more seed and a light top-dressing of nitrate of soda, used in the proportion of 1 pound to the square rod, that is about 160 pounds to the acre. If the lawn is small, the most convenient way to apply the nitrate of soda is to dissolve it in water, 1 pound in 5 gallons, and apply it with a watering-pot, but the same proportion of the salt to the space must be preserved, viz. 1 pound to the square rod.

ROOT CROPS.

Roots in most places were an excellent crop throughout the province, but there were various injuries from insects. The Cabbage or Radish Maggot (*Anthomyia radicum*, Bouché) did much injury to turnips as well as to cabbages and cauliflowers in gardens. It was, however, irregular in its occurrence, doing much harm in one place, while in another very close to it, it hardly appeared at all. The Onion Maggot (*Phorbia ceparum*, Meigen) appeared in the same irregular manner but was the cause of more loss, some fields of onions being entirely destroyed. We have still to find a satisfactory remedy for these troublesome root maggots. In the case of the Cabbage Maggot when attacking cabbages or cauliflowers, the best remedy is undoubtedly the application of the disks of tarred paper recommended by Prof. Slingerland. We have now used them at the Central Experimental Farm for several years and always with great satisfaction. Where these have not been put on early, a remedy which may be used is to pour a small quantity of a strong decoction of pyrethrum insect powder (4 ozs. to the gallon of water) around the root of each plant after drawing away the earth right down to the rootlets; the earth must then be put back again. Half a teacupful will be sufficient for each plant. For onions and radishes, dusting white hellebore along the rows, as soon as the young plants appear, has given good results when the insects are not abnormally abundant. Kerosene emulsion has also been used by some people with satisfaction. For garden radishes, undoubtedly the best application is Prof. Cook's Carbolic Wash, made by adding one quart of soft soap (or one pound of hard soap) to a gallon of water; heat to the boiling point, and then add half a pint of crude carbolic acid. When required for use, take one part of this mixture to fifty of water and sprinkle directly upon the growing plants once a week from the time they appear above the ground. The chief trouble in the case of root maggots is that gardeners trust too much to chance that the plants will not be attacked; but, as a matter of fact, in every part of Ontario it must be expected that cabbages, radishes and onions will be attacked, and, unless preventive measures are adopted, there will be considerable loss every year.

Some experiments undertaken by Mr. W. T. Macoun, the Horticulturist of the Central Experimental Farm, during the past summer with the object of producing early tobacco and vegetables of high quality, have an important entomological bearing, which is well worthy of mention here. An enclosure was made with a light frame work of wood six feet in height and covered entirely on the top and along the sides with cheese cloth. In this tent tobacco and various kinds of vegetables were sown or planted, and a similar duplicate plot was also planted just outside, with the same conditions of soil and soil moisture. The rows of this plot were practically in continuation of the rows within the enclosure. The experiment was very satisfactory as far as forcing all the plants grown to earlier maturity; but the important observation was made by Mr. Macoun that this cheap protection prevented entirely the attacks of many kinds of injurious insects. Radishes, onions, cabbages and cauliflowers were absolutely free from root maggots. Nothing was attacked by the troublesome Tarnished Plant-bug (*Lygus pratensis*, L.), or the Four-lined Leaf-bug (*Pœcilocapsus lineatus*, Fab.), and cucurbits of all kinds were entirely free from injury by the Striped Cucumber Beetle. In fact, this experiment has furnished us with a sure means of growing many vegetables of which, from the difficulty of getting them in perfect condition, gardeners had in some places given up the cultivation. This is particularly the case with cauliflowers, cabbages, radishes and onions, and other plants of only moderate height. which could be entirely protected by a frame-work only three feet high and three feet wide for single rows. With such a covering it would be impossible to cultivate between the rows; but the cost of building an enclosure in which a man could work with ease and where several hundreds of plants could be grown, is so little, that paying results can certainly be obtained with many kinds of plants. Careful handling in taking down and storing away the cheese cloth and framework would ensure the lasting of these for at least two or three years. Such enclosures are manifestly unsuitable for the cultivation of plants like egg plants and cucurbits, which need the intervention of insects for the fertilization of the flowers.

The Carrot Rust-fly (*Psila rosæ*, Fab) is merely an intermittent enemy of the carrot in Ontario. It occasionally appears and does a considerable amount of injury, particularly to red carrots. In the Maritime Provinces, where it seems to find conditions better suited to its development and where these are certainly more like those in its European home, the Carrot Rust fly is a regularly occurring enemy of the carrot. During the past summer I was surprised to find at Ottawa the same insect attacking the roots of Celeriac, or Turnip-rooted Celery. Dr. E. P. Felt, State Entomologist of New York, also records a similar injury to celery in his report for 1902. The galleries in the roots of the celery are marked with the same bright rusty red colour which is noticeable on carrots. Strange to say, this year carrots grown in a bed almost adjoining the Celeriac showed no trace of injury ; but it should be stated that these carrots were sown very late in the season, not until July, which may have had some bearing on the case ; for it has been noticed by several growers that, when carrots are sown late, the injury is much less, even in districts where the Rust-fly is abundant. This insect passes the winter in the puparium, which is formed in the earth around the roots, or in the sand in which they are stored for winter. The adult flies emerge the following spring and lay their eggs at the roots of young carrots, frequently, as was observed by Miss Ormerod, creeping down beneath the surface wherever any crevices occur. The first appearance of attack is on the outside of the young roots, and more often towards the tip than higher up. At the same time some of the leaves of the carrot turn purple, which is also an indication of injury, and such plants should be pulled out as soon as noticed. When carrots are harvested at the end of the season, the injuries by the maggots are frequently inconspicuous, although the root may be honeycombed in every direction as will be seen when it is cut for cooking. When carrots are grown for table use, they are rendered worthless on account of the discolored tunnels which traverse the root in every direction. The remedies for this insect are sowing in new ground, sowing late, and the protection of growing plants with deterrent applications, such as kerosene emulsion, one part to ten of water, or a carbolic wash, such as the Cook wash mentioned above under Radish Maggot, to be sprayed along the rows immediately after hoeing or thinning out ; or the dusting of sand, land plaster, or ashes, which have been saturated with kerosene at the rate of half a pint to three gallons, may be practised instead. The liquid washes, however, are rather better, because they wash soil around the roots again, and fill up all crevices which may have been made when thinning out, and into which the females might creep to lay their eggs. When carrots or celery have been stored in earth or sand, this should be carefully buried in a deep hole, so that the flies on hatching may be prevented from getting out.

Owing to the wet autumn, injuries from Slugs and Millepedes have been more frequent than usual. These are not insects, but advice concerning them is usually asked from entomologists. For Slugs light top-dressings of salt or fresh lime at short intervals are very useful. For Millepedes applications of nitrate of soda have proved effective—at the same time this salt is an exceedingly valuable and quick-acting fertilizer for all vegetation.

The Asparagus Beetles (*Crioceris asparagi*, L., and C. *12-punctata*, L.) have continued to do some damage in the Niagara district and have also evidently increased their area of infestation. In last year's report Mr. Moffat recorded the 12-spotted Asparagus Beetle as having occurred abundantly at London, Ont. During the past summer the common Asparagus Beetle (Fig. 25) was found much further east than it has been found before. Mr. J. Macnamara sent in specimens from Bracondale, close to Toronto ; so, there is a probability, as asparagus is

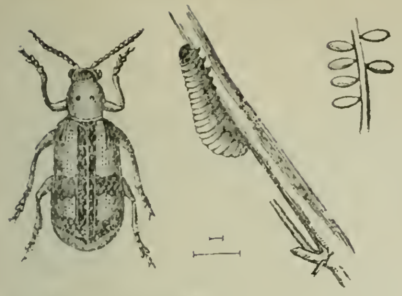

Fig. 25.—Asparagus Beetle, larva and eggs.

so generally grown, that this insect will soon spread much further through the province. The remedies for the two kinds of Asparagus Beetles are the same and consist of (1) Dusting the plants at short intervals with fresh air-slaked lime at the time the slimy slug-like larvæ are found upon them. This is best done early in the morning when the plants are covered with dew. (2) Poisoning with Paris green. This useful insecticide, diluted with flour or lime and applied dry in the same way as these powders are used for the Colorado Potato Beetle, answers well. The material not only kills the larvæ by coming in contact with their bodies, but destroys both the larvæ and the perfect beetles when they eat the poisoned foliage. (3) Beating the beetles and larvæ from the asparagus plants into beating nets or open pans containing water with a little coal oil on the surface, is an effective remedy. A good pattern for an easily made net, which can be held beneath the plants with one hand while the insects are beaten down on to it by striking the plant with a light rod, has a stick on each side and a flat sheet of cotton between, three feet wide at the top and one foot at the bottom. Two cross bars close together at the base allow of this net being easily held by taking the upper bar in the left hand so that the lower bar rests against the back of the wrist. Figure 26 appeared in the "Canadian Entomologist" many years ago and shows a most convenient beating net which I have used a great deal. The viscid larvæ are easily brushed from the plant with a stick, and it is claimed that, if this is done in the middle of a hot day, few of them will get back again on to the plants, as a very short time in the hot sun proves fatal to them. Chickens and ducks will eat these insects with avidity, and if the plants are beaten, they will soon learn to pick them up as they fall.

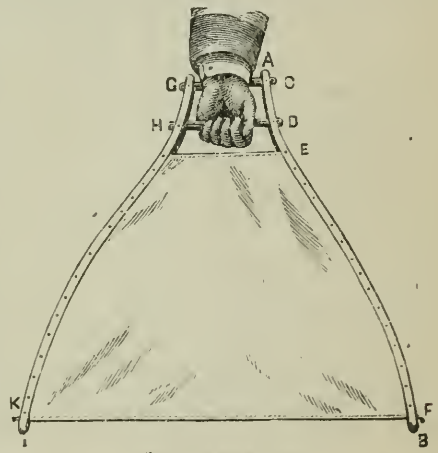

Fig. 26. Beating net.

The Striped Cucumber Beetle (*Diabrotica vittata*, Fab.), Fig. 27, has, as usual, done some harm to squashes of all kinds, cucumbers and melon plants. As soon as the young plants appear above the ground, they are attacked by the beetles which have wintered over in the adult state. A perfect remedy for these troublesome insects is still wanted. When they do not appear in very large numbers, there are many partial remedies which are worthy of trial. Among these, the sifting of dry ashes or land plaster and Paris green (1 to 50) over the vines, is the best application and must be applied early in the season as soon as the insects appear. Hardwood ashes alone are useful, but the additional poison does far better work. A remedy which is largely adopted by the large cucumber and melon growers of the United States, consists of covering the vines with a piece of gauze cheese cloth, large enough to cover the hill easily, and supported by two or three sticks stuck into the ground, the edges of the cloth to be held down by putting a little earth on them. By the time that the plants are large enough to require the removal of the cloth, the first brood of the beetles will be passing away.

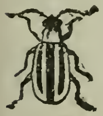

Fig. 27.

The Cabbage Aphis (*Aphis brassicæ*, L.) was only referred to occasionally in Ontario correspondence; however, the insect was the cause of considerable loss both in British Columbia nd Prince Edward Island upon cabbages and turnips. When cabbages in gardens are attacked, the aphis may be controlled by spraying with whale-oil soap. In turnip fields, where the greatest amount of injury is done, a sharp lookout must be kept at the time of thinning for any infested plants, which must then be hoed out and destroyed.

FRUIT CROPS.

The fruit crops of the province were on the whole satisfactory and remunerative to most growers. The plum crop was enormous in all districts and comparatively free from injury by insects. Fungous diseases were more destructive by far than insect enemies. Peaches in western Ontario were a full crop. Grapes in western counties were very seriously affected by the Black Rot. Apples were a large crop and the fruit was of excellent quality. In the eastern part of the province they were free from injuries of all kinds, but in western Ontario they were somewhat injured by the Black Spot of the apple (*Fusicladium*) and late in the season to some extent by Codling Moth. The pear crop is reported as good, but the ravages of the Pear-tree Slug (*Eriocampa cerasi*, Peck) were serious in some places. A few reports were received of injuries by the Pear-tree Psylla (*Psylla pyricola*, Foerster); but the injury by this insect has not been as great as at one time was anticipated. Nevertheless, in some localities, serious damage has been done. Prof. Lochhead tells me of one such occurrence in the Grimsby district, where a whole orchard was found to be infested in July and serious harm done to the trees. There is no doubt that this insect is widely spread throughout the Dominion; this year I have received specimens from two places in the province of Nova Scotia. The effects upon infested trees are a dwarfed and stunted growth and a dirty appearance of the trees caused by the growth of the Sootty Fungus (*Fumago salicina*) upon the copious honey-dew which is emitted by these flea lice in large quantities. When trees are badly attacked, it takes them several years to overcome the injury, and many trees are actually killed outright. The best treatment for trees which are known to be infested, is to spray the trunks during the winter with coal oil emulsion or some other wash to destroy the hibernating insects. As winter approaches, the perfect flea-lice, which in shape very much resemble a minute *Cicada*, creep beneath the scales of the rough bark upon pear trees and remain there until the following spring, when they emerge in the warm days of April and lay their eggs upon the young wood. A remedy which has been highly spoken of, is one which has been used by Mr. Henry Lutz, of Youngstown, New York State. In 1896 a large Duchess orchard belonging to him was almost ruined by Pear tree Psylla In February, 1897, the whole orchard was thoroughly sprayed with a whitewash, and two years afterwards this orchard was almost free from the Psylla. Mr. Lutz explains his plan as follows: "During the cold weather in December we spread a canvas under the trees and then scrape off all the rough bark; this dislodges many of the torpid insects, which are burnt with the scrapings. We then give the trees a thorough coating of slushy whitewash, made of freshly slaked lime which has been run off in a putty state, as masons usually make it for plastering. We thin this with skimmed milk, and put it on to the trunks of the trees with a brush; for those parts of the tree which we cannot reach, we thin down the whitewash with more milk and then give the whole tree a thorough spraying. In this way we destroy a large number of the hibernating Psyllas, and those which are not killed, are so well sealed up that they cannot get out to lay their eggs. We spray again in March to coat the wood and buds, so that the few that are alive can find no favorable places to lay their eggs The orchard where we experimented contained a thousand trees which were practically worthless; but, since we began using the lime, it has steadily regained its vigor." Trees sprayed in spring with lime-sulphur-and salt wash were found by Mr. Joseph Tweddle, of Stoney Creek, to be quite cleared of the eggs of this insect.

The Apple Aphis (*Aphis mali*, Fab.) was reported from several localities, and it was claimed that it had done much injury: but all of these reports were made at the time the insects were swarming on the trees, and in all cases they soon disappeared. The worst injury which I have noticed from the Apple Aphis, was to young trees in nurseries and to the young green apple which, in some varieties more than in others, were much distorted and disfigured, so as to give very much the appearance of apples which had been stung by the small British Columbian Apple Fruit Miner (*Argyresthia conjugella*, Z.). Wherever the fruit is punctured, growth ceases, and, with the subsequent increase in the size of the fruit, these places remain as pits or depressions, rendering the fruit unsightly and unfit for the market. This injury, however, is not a common one, but it points to the advisability of spraying trees for the Apple Aphis, should the fruit, when forming, be found to be badly infested. Injury by the Apple Aphis, in Ontario at any rate, is very seldom serious enough to bearing trees to make the expense of spraying for that insect alone advisable. On nursery stock for budding it must be attended to when abundant, or injury will be done. Should this be necessary at any time, the best remedy is to spray the trees thoroughly with whale-oil potash soap, using one pound to six gallons of water. The addition of a pound or two of home grown tobacco to a barrel of mixture is beneficial but is not actually necessary, because the green-colored plant-lice, such as the Apple Aphis, are more easily killed than the black varieties, as the Black Cherry and Peach Aphides.

The Plum Aphis (*Aphis prunifolii*, Fitch) appeared early in the season, and it was thought it would do much harm, but suddenly there was so great a diminution in the numbers of the insects from the increase in their natural parasites, that practically no loss resulted. The same state of affairs also prevailed in Western Ontario with the Black Cherry Aphis.

The Oyster-shell Bark-louse (*Mytilaspis ulmi*, L.) is still one of the worst enemies of the apple grower in all parts of the Dominion, and is particularly destructive in the eastern part of our province. In the south-west it seems to be kept in check to a large extent by the minute chalcid parasite, *Aphelinus mytilaspidis,* LeBaron. The presence of this parasite in a colony of the scales can be detected by the minute round holes left by the flies in the top of the old scales, from which the parasites have eaten their way out. This little parasite does good work in all parts of the Dominion from the Atlantic to the Pacific ; but, strange to say, notwithstanding the enormous abundance of the scale, it is very intermittent in its appearance. In the Maritime Provinces the Oyster-shell Bark-louse is to a certain extent kept in check by a parasitic fungus similar to that which destroys the San José Scale in Florida. The remedies for the Oyster-shell Bark-louse have been frequently given ; they consist of high cultivation of infested trees and spraying in winter with lime wash, followed in summer with kerosene emulsion. Where trees have been treated with the lime-sulphur-and-salt wash they have been thoroughly cleaned of this scale.

The San José Scale (*Aspidiotus perniciosus*, Comst.)—I regret to say that the San José Scale situation is very little better to-day than it was a year ago. The insect, although it has not spread widely beyond the limits already recorded, has most decidedly increased in individual orchards and is doing an enormous amount of harm. The Federal Government fumigation Stations have watched most jealously every shrub and tree which has been imported that was in the least likely to bring into the country fresh importations of the scale ; and it is but just to state that, up to the present time, not a single instance has been found of new infestation from stock brought into the country or of a live scale upon any tree which has been fumigated. Many of our fruit growers, recognizing the importance of remedial treatment, have sprayed their trees with remedies which have been recommended and have obtained paying results. The remedies which have been used to the greatest extent, are those which were recommended at the San José Scale conference held at the annual meeting of the Entomological Society of Ontario in 1901, viz. whale-oil soap, petroleum, and fumigation, or the lime-sulphur-and-salt wash ; these have been recommended by Mr. Geo. E. Fisher as Inspector of San José Scale. Quite recently experiments have been made with a carbolic wash made by Mr. G. A. McBain, of St. Catharines, and also with a lime and sulphur wash in which the sulphur was combined with the lime by means of caustic potash. Both of these remedies are claimed to have given good results, and many have tried the former during the past summer in western Canada. There is no doubt that the lime-sulphur and salt wash will clear trees of the scale to the extent of allowing them to retain their vigour and bear paying crops of fruit. The same may be expected confidently from the newer but similar lime-sulphur and potash wash which is much more easily made; and, if the McBain Carbolic Wash can be procured at a price equal to that of these washes and will kill the scale as effectually, it will certainly become a very popular wash, owing to a very important characteristic, the ease with which it can be diluted with water at the time it is required for spraying. Such experiments as I have been able to examine, showed that a large proportion of the scales were killed with one application, but not enough to free the trees from the danger of thorough reinfestation before the end of the season. I am told, however, that these same trees have been again treated and that they are now practically, although not entirely, free from scale. We have then several practical remedies by which this disastrous enemy can be controlled, if fruit growers will use them. It is of the greatest importance that everyone who understands the gravity of the case should endeavor to stir up those who are less informed, to greater effort in fighting this pest, which is costing the country so much every year in actual money for fumigation and inspection and also, just as surely, in reduced crops and in the destruction of valuable fruit trees and nursery stock. People in the infested districts are getting used to the idea of the presence of the San José Scale, and, having become familiar with it, are, I fear, doing less to control it. It is, however, all the time becoming worse and worse; the injury is increasing, and, what is of the greatest importance, this need not be the case, if all concerned would make greater efforts to control the insect and prevent it from spreading in their own orchards and from their own trees to those of their neighbors.

A green Apple Sawfly (*Taxonus nigrisoma*, Nort.)—Prof. Lochhead referred at the last annual meeting to a green sawfly larva which had been found several times in apples. This is that of the above named sawfly, which usually feeds on plants of the Dock family. Attention having been drawn to it, it has been noticed in many different localities, and it would appear as if this habit of eating into apples to pass the winter is more frequent than was at first supposed. I cannot hear of anyone having observed the larvæ feeding on any part of the apple tree, nor do I anticipate that this will ever develop into a serious pest All plants of the Smartweed or Dock family should be destroyed when they occur in orchards, so that there may be nothing to attract the egg-laying females.

The Plum-leaf Sawfly (*Dimorphopteryx pinguis*, Nort.).—European plums at Ottawa this autumn were noticeably attacked by the curious larva of this sawfly, leaves of plum trees during August and September being very much riddled, and in many cases almost totally devoured by the larvæ. These when full grown are about three quarters of an inch in length, and lie exposed on the surface of the leaves, sometimes as many as three or four on a leaf. They have a peculiar habit, when at rest, of lying with the body curved in the shape of an open S. The general color above is olive green, with two wide black stripes down the sides. The head is bright chestnut red beneath and black above; close behind the head are three fleshy white prominences, two in front and one close behind it. The anal flap has a transverse row of four of these which are black, and the previous segment bears two more anterior to these. The infrastigmatal fold is edged with a row of white-tipped tubercles, giving a somewhat fringed appearance to the larva as it lies on the leaf. The larvæ late in the autumn burrow a short distance into the soil, where they form tough cocoons, from which the flies emerge the following spring. These sawflies are about the size of the common Currant Sawfly, but have the thorax dark brownish black with a conspicuous light central point; the abdomen is chestnut red darkened at the tip. The head is black and square, the antennae are thick and red, the legs red, darkened at the joints. The perfect sawflies appear in June and July, and the larvæ are found on the trees as early as August and late into September. I have also once found the larvæ feeding on the Norway Maple and perhaps on Bass-wood.

There were no important outbreaks of small-fruit pests brought to my notice during the past season. The usual pests which occur every year, as the Currant Sawfly, Currant Looper, Currant Aphis, White Grubs in strawberry beds, Cutworms, Raspberry Cane-borer, and Raspberry Sawfly, and a few grape pests were reported ; but little injury was done, and remedies are known for all of these.

OBSERVATIONS UPON THE FOOD-HABITS OF HYMENOPTEROUS LARVÆ.

By Rev. Thomas W. Fyles, Levis, Que.

Nature has its tragedies : of such, entomology supplies numerous and startling examples. Over-sensitive people may shudder at the thought of them, and be inclined to wonder that the Beneficent Being, who originated and over-rules the forces of nature, should allow occasion and place for them. But what would become of humanity if such creatures as the Hessian Fly, the Army Worm, and the Potato Beetle were allowed to increase without a check ? Is the thought of mankind, and innumerable classes of inferior animals, perishing miserably of starvation less appalling than the consideration of nature's methods of keeping down destructive pests ? Human agency is often called in for the suppression of insect devourers ; but can we say that the means of man's using, the burning, the crushing, the poisoning by Paris Green, etc., are as far-reaching, as effective, as merciful, as those which nature uses to the same end ?

It may be asked, Why are such destructive vegetarians as those you have mentioned allowed a place in the economy of nature ? Doubtless to clear the districts they affect of exclusive growths, that other plants may be preserved and perpetuated. Where destructive insects intrude upon the fields of human industry, human reason and ingenuity are called into play for their suppression ; and man is glad to perceive that he has numberless allies working for the same end.

The fact is that the equilibrium in nature is maintained by a system of checks and counter-checks ; and the more we examine this system, the more our admiration is excited by it.

It is not my purpose to enter upon a systematic investigation of the Hymenoptera ; time and space are not at my disposal for such an investigation. I shall confine my attention to a brief consideration of the modes in which the larvæ of these creatures assail their victims.

I find then that parasitic and predaceous Hymenopterous larvæ may be classed thus :—

A. Those that assail their victims *from without.*
    1. Those that suck the juices of their victims.
    2. Those that devour their prey bodily.

B. Those that carry on their deadly work *within* their victims.
    1. Those that leave their hosts to undergo their after changes.
    2. Those that enter upon the pupal stage within their hosts.

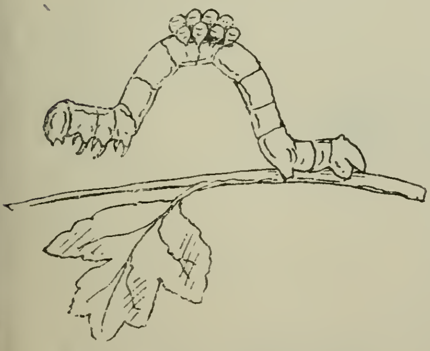

Fig. 28. Larva of Geometrid (original).

A.—1. Some years ago I found a yellow larva of a Geometrid which presented a strange appearance. (Fig. 28). It had, seemingly, on the upper surface of its middle segments, a bunch of bluish green follicles, which it carried about as Christian carried his bundle of sins ; but, unlike Christian, it never in life was freed from its burden. The seeming follicles were larvæ pressed closely together, and distended with food. Each of them had its nozzle inserted in the back of the poor caterpillar, and was draining its life-juices. The victim succumbed in a few days ; and then its assailants spread over its underside, and, after draining what nutriment they could find there, spun their cocoons and went into the pupal stage. In due time the flies appeared. I am indebted to that prince of Hymenopterists, Dr. W. H. Ashmead, of Washington, for the identification of the species—it is *Euplectrus frontalis*, Howard.

The caterpillars of the beautiful Gelechian of the White Aster live in hollow galls, in the stems of that plant—one caterpillar in a gall. A small Braconid, Fig. 29, —(*Bracon furtivus*, Fyles) detects the hermit in his dwelling, inserts her ovipositor and drops a few eggs into the chamber. These eggs soon hatch; and the little larvæ that come from them (Fig. 30) attach themselves to the caterpillar and exhaust its life's juices. They spin their cocoons within the gall; and the flies from them appear in the spring of the following year.

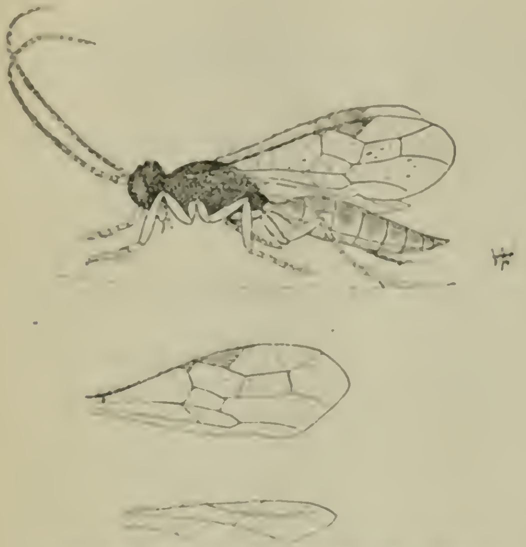

Fig. 29. Bracon furtivus, greatly magnified, (original).

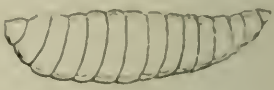

Fig. 30. Bracon furtivus larva, greatly magnified, (original).

Notice the form of these sucking larvæ (Fig. 30).

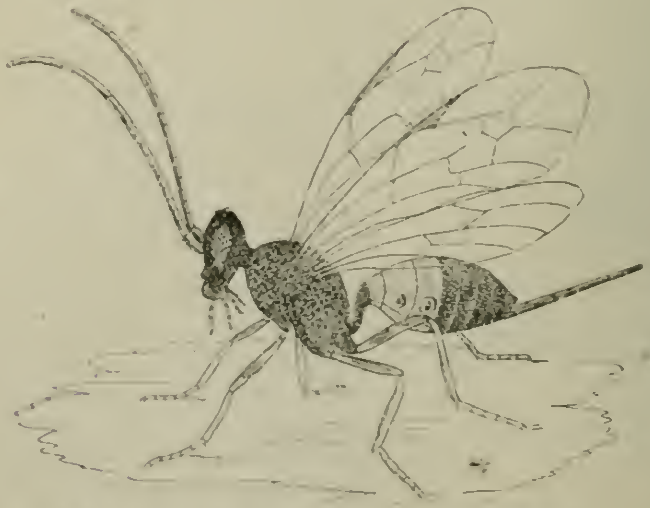

Fig. 31. Trychosis tunicula-rubra, greatly magnified, (original).

A.—2. The same Gelechian has another foe of a larger build (*Trychosis tunicula-rubra*, Fyles) Fig. 31, which intrudes a solitary egg into the gall. From the egg comes a larva with a good-sized mouth, the upper lip of which has a beak-like formation for cutting and tearing, (Fig. 32). This larva assails the rightful inhabitant of the gall and *devours* it. I have found it making its last meal of the fragments of the chrysalis, (Fig 33).

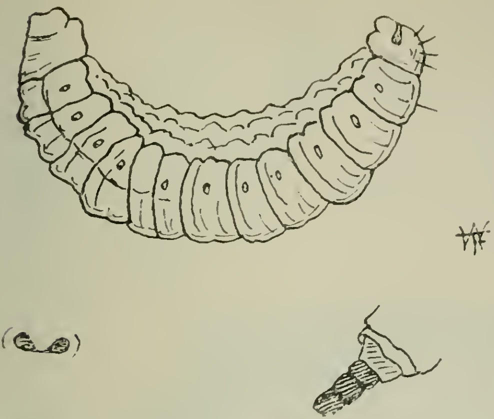

Fig. 32. Larva of T. tunicula-rubra, mouth and terminal segment, greatly magnified, (orginal).

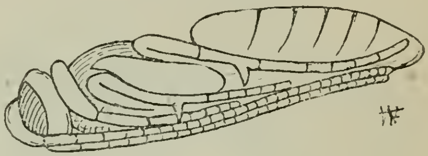

Fig. 33. Chrysalis of T. tunicula-rubra, greatly magnified, (original).

B.—1. In our walks in the fall and winter we sometimes notice under the cross-bars of fences and in other sheltered spots a fluffy white or yellowish ball, that looks like a wad of cotton batting. On examination we find that it is made up of delicate cocoons. The larvæ which spun these cocoons lived inside a forest tent-caterpillar (or one of some other species) till it ceased to feed. Then they broke through the skin, and "spun up" over the remains of their host. They belong to the species *Apanteles longicornis*, Prov. I have a mass of such cocoons before me, and the flies that came from it—they number 95. What a brood of larvæ an unfortunate caterpillar must have carried within it! How rapid under favorable circumstances must be the increase of this Apanteles!

B.—2. At St. Joseph, about a mile from Levis, there is, beside the Intercolonial Railway, a bold escarpment of great height, which forms a conspicuous object in the view from Quebec. It is crowned with a tangled growth of shrubbery. Its summit is the only spot in the neighbourhood, that I know of, in which the scented Lady's Slipper, (*Cypripedium parviflorum*, Salisb.) is to be found. Last year while digging up some roots of this, I unearthed a climbing cut-worm, that evidently had been feeding upon the leaves of the plant. I took the caterpillar home, and it went into chrysalis; but from the chrysalis came—not a moth as I had expected, but—a fine active specimen of *Ichneumon lætus*, Brulle. The creature had undergone its changes within the body of its host.

Examples might be multiplied of insects belonging to the several classes above mentioned. Numbers of such insects are of economical importance, as attacking the depredators upon various growing crops. Enough however has been said to show that a vast army of minute assistants are working in favour of the husbandman; and that, as regards the different modes of their operations, *good* is undoubtedly *the final goal of* (seeming) *ill*.

A KEY TO THE INSECTS AFFECTING THE SMALL FRUITS.

By Prof. W. Lochhead, of the Ontario Agricultural College.

Bramble Insects.

A. *Attacking the Roots and Base of Canes.*

1. Large grub over 2 inches long, boring large tunnels in the woody portions of main root. The canes suddenly die.

   Giant Root-Borer (Prionus laticollis), Fig. 34.

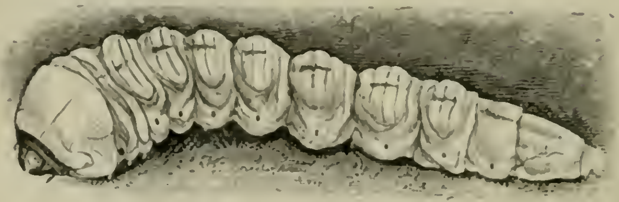

Fig. 34. Prionus laticollis grub.

2. Canes at base of main root girdled by a yellowish white caterpillar, in late summer and autumn.

   Bramble-crown Borer (Bembecia marginata).

B. *Attacking the Canes* :

1. Longitudinal row of punctures on canes.

   Snowy Tree-Cricket (Œcanthus niveus), Fig. 35.

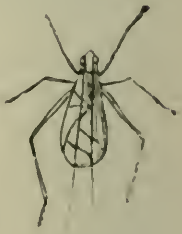

Fig. 35. Tree-Cricket

2. Tips of raspberry canes wilting in early summer, due to a girdling of the canes inside the bark.

   Raspberry-Cane Maggot (Phorbia sp.).

3. Tips of shoots of raspberry wilting ; two rows of punctures one inch apart at base of wilted portion, with a small hole between. Canes are burrowed to the base before autumn.

   Raspberry Cane-Borer (Oberea bimaculata).

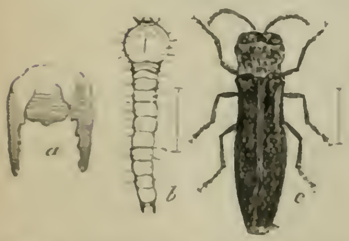

Fig. 36. Red-necked Cane-borer ; b, grub ; a, horns at anal extremity ; c, beetle all magnified.

4. Swellings on canes of raspberry and blackberry.

   Red-necked Cane-Borer (Agrilus ruficollis), Fig. 36.

C. *Injuring the Buds* :

1. A small snout-beetle, puncturing the flower-stem close to the buds, and also the buds.

   Strawberry Weevil (Anthonomus signatus)

2. A small yellowish beetle eating the flower-buds, which fail to open, or wither.

   Pale Brown Byturus (Byturus unicolor).

3. A small brownish caterpillar eating the opening buds.

   Bud Moth (Tmetocera ocellana), Fig. 37.

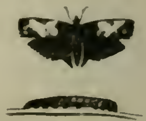

Fig. 37. Bud-moth and larva.

D. *Attacking the Leaves* :

1. Insects sucking the sap of young growing parts, and arresting their development.

   Tarnished Plant Bug (Lygus pratensis).

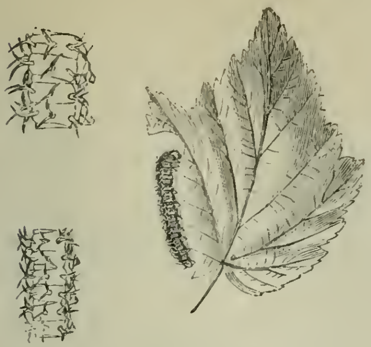

Fig. 38. Raspberry Saw-fly: Larva on leaf segments magnified to show arrangement of spines.

2. Suckers and leaves curl up with enclosed lice.
Bramble Flea-Louse (Trioza tripunctata).

3. Small larva eating the leaves, in spring.
Raspberry Saw-Fly (Monophadnus rubi), Figs. 38 and 39.

E. *Attacking the Fruit*:

1, A looper feeding on fruit of raspberry and blackberry.
Raspberry Geometer (Synchlora glaucoria), Fig. 40.

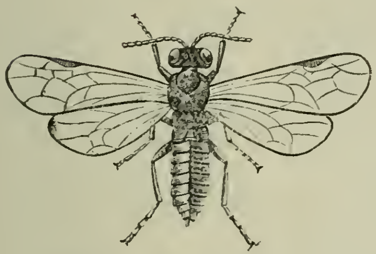

Fig. 39. Raspberry Saw-fly.

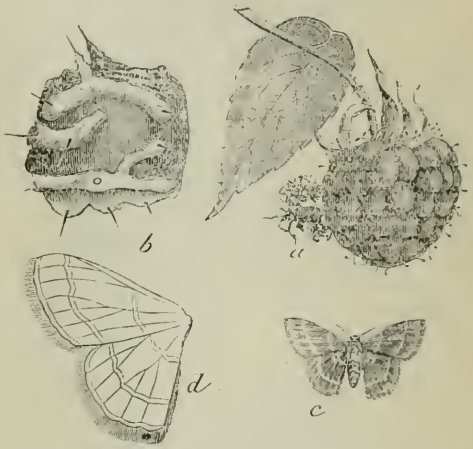

Fig. 40. Raspberry Geometer: *a*, larva, natural size, on fruit; *b*, segment, magnified, shewing hairs, etc.; *c*, moth natural size; *d*, pair of wings enlarged—color pale green.

GROSELLE INSECTS.

A. *Attacking the Canes*:

1. Tips of canes girdled and wilted; pith tunneled.
Currant Stem-Girdler (Janus integer).

2. Centre of canes tunneled by a white caterpillar.
Imported Currant-Borer (Sesia tipuliformis), Fig. 41.

Fig. 41. Clear-winged moth of Currant-borer.

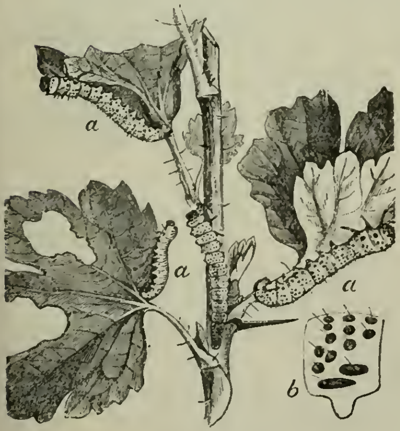

Fig. 42. Currant Worms.

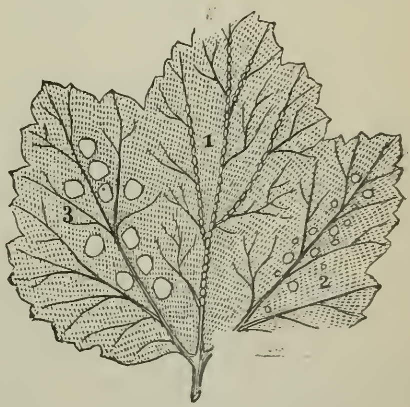

Fig. 43. Currant Saw-fly: leaf showing eggs and holes eaten by the young larvæ.

3. Small, flat, circular scales, black or gray, with a depressed ring about a central nipple in black forms.

San Jose Scale (Aspidiotus perniciosus).

4. Oval, hemispherical scales.

Currant Lecanium (Lecanium ribis).

B. *Attacking the Leaves* :

1. Larvæ, 20-legged, dull white when young, then greenish with black spots, finally greenish-yellow, eating holes in the leaves in early spring.

Imported Currant Worm (Nematus ribesii), Figs. 42 and 43.

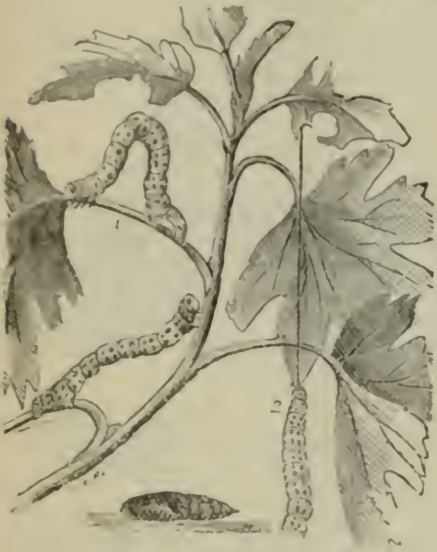

Fig. 44. Currant Span-worms; 3, the chrysalis.

2. Leaves curled, blistered, and with a reddish appearance on upper surface, caused by yellowish plant lice.

Currant Plant-Louse (Myzus ribis).

3. Leaves turning brown and dying.

Four-Lined Leaf-Bug (Pœcilocapsus lineatus).

4. Measuring worm feeding on leaves of gooseberry and black currant.

Currant Span-Worm (Diastictis ribearia), Figs. 44 and 45.

5. White spots on leaves, produced by a pale green sucking insect occurring on the under surface.

Currant-Leaf Hopper (Empoa albopicta).

C. *Attacking the Fruit* :

1. Greyish caterpillar boring into young fruit, and eating out its contents.

Gooseberry Fruit Worm (Zophodia grossulariæ).

2. Purplish spots surrounding small circular scales.

San Jose Scale (Aspidiotus perniciosus).

3. Yellow oval maggots, eating the Gooseberry.

Gooseberry Midge (Cecidomyia grossulariæ).

4. Small white grub eating the currant and gooseberry, causing the fruit to turn red and fall.

Currant Fly (Epochra Canadensis).

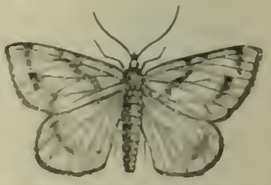

Fig. 45. Currant Span-worm Moth (pale yellow with dusky spots).

GRAPE INSECTS.

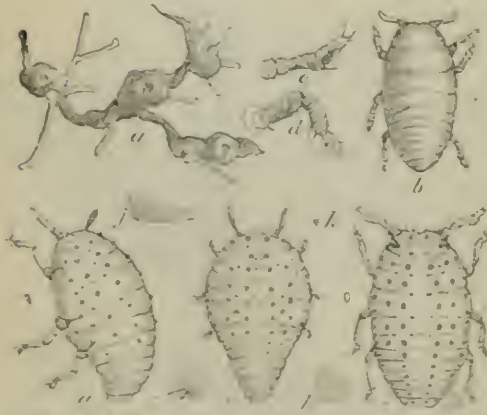

Fig. 46. Grape-vine Phylloxera — a, galls on rootlets; b, young louse; e, f, g, more matured lice; c, antenna; d, leg.

A. *Attacking the roots* :

1. Producing little irregular spherical galls on rootlets and larger roots, causing death.

Grape Vine Phylloxera (Phylloxera vastatrix), Fig 46.

2. Large borer, cutting a tube through the root near the surface.

Broad-necked Prionus (Prionus laticollis.)

3. Grub eating the bark of both the large and small roots.

Grape-vine Fidia (Fidia viticida.)

B. *Attacking the Branches* :

1. Young shoots suddenly break off or

droop in spring ; a small hole just above the base of the shoot leads into a burrow.

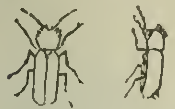

Fig. 47. Apple Twig-borer, the beetle.

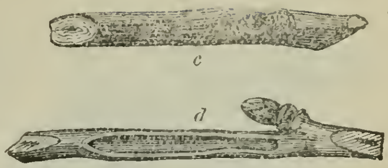

Fig. 48. Apple Twig borer, c hole made by borer, d burrow.

Apple Twig-Borer (Amphicerus bicaudatus). Figs. 47 and 48.

2. Canes show roughened longitudinal rows of perforations in the bark.

Snowy Tree-Cricket (Œcanthus niveus).

3. Canes exhibiting white cottony masses attached to a reddish brown scale.

Cottony Scale (Pulvinaria innumerabilis.)

4. Canes exhibiting white frothy masses which resemble spittle.

Spittle Insect (Aphrophora, sp.)

C. *Attacking the Leaves* :

1. Leaves riddled with irregular holes about midsummer, by a little beetle.

Grape-Vine Fidia (Fidia viticida), Fig. 49.

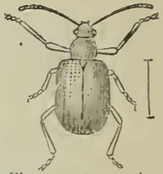

Fig. 49. Grape-vine Fidia.

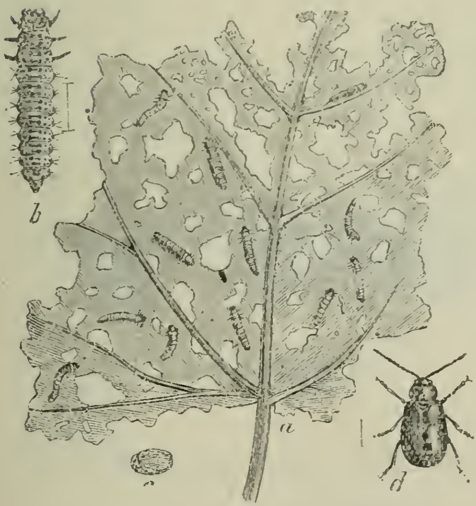

Fig. 50. Grape-vine Flea beetle and larvæ.

2. Boring into buds in spring, also eating small holes in expanding leaves, small shining blue beetle.

Grape-Vine Flea-Beetle (Haltica chalybea,) Fig. 50.

3. Long legged, brownish beetles eating the blossom, leaves and fruit.

Rose-Chafer (Macrodactylus subspinosus).

4. Greenish caterpillar, feeding within a folded leaf and skeletonizing it, about midsummer.

Grape Leaf-Folder (Desmia maculatus), Fig. 51.

5. Leaves blotched and scorched, finally curling up and falling, by little jumping insects.

Grape Thrips or Leaf Hopper (Typhlocyba vitifex.)

6. Large greenish caterpillar, with a pale yellow strip down each side, and a horn near tail.

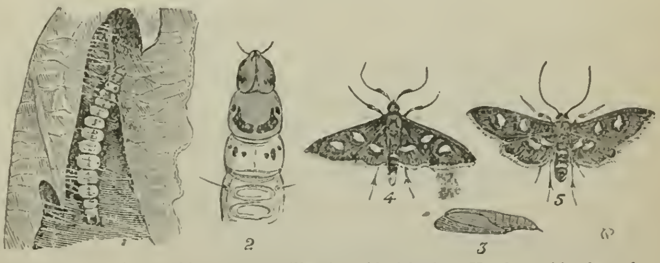

Fig. 51. Grape Leaf-Folder; 1 caterpillar in fold of leaf; 2 Head much enlarged chrysalis; 4 and 5 the moths.

Grape Vine Sphinx (Darapsa myron), Fig. 52.

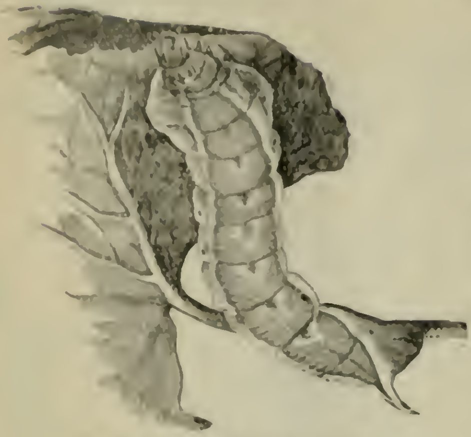

Fig. 52 Grape-vine Sphinx caterpillar.

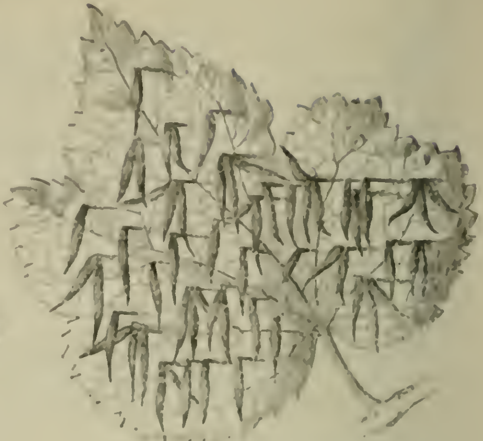

Fig. 53. Trumpet Grape-Gall.

7. Several other sphingid larvæ feed on the leaves of the Grape.

8. Black beetle eating the tissues on the upper surfaces of the leaves, and discoloring them.
Red Headed Systena (Systena frontalis).

9. Producing reddish, elongated, conical galls on the leaves.
Trumpet Grape-Gall (Vitis viticola), Fig. 53.

10. Large reddish yellow beetle with six black spots on wing-cover eating holes in leaves.
Spotted Pelidnota (Pelidnota punctata), see Fig. 7.

D *Attacking the Fruit* :

1. Ripening fruit discolored, and burrowed by a whitish caterpillar.
Grape-berry Moth (Eudemis botrana), Fig. 54.

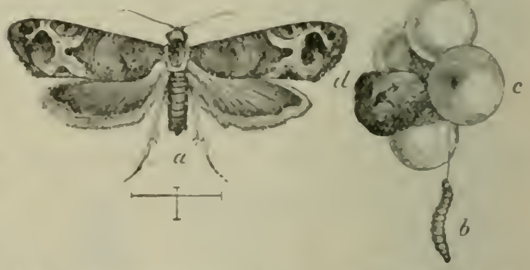

Fig. 54. The Grape-berry moth ; *a* much magnified ; *b* full-grown larva ; *c* spot where larva entered ; *d* injured berry.

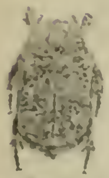

Fig. 55. Bumble-flower beetle.

2. Eating holes in ripe fruit, beetle large, yellowish, hairy.
Bumble -flower Beetle (Euphoria inda), Fig. 55.

3 Eating holes in young fruit, a long legged beetle.
Rose-Chafer (Macrodactylus subspinosus).

STRAWBERRY INSECTS.

A. *Attacking the Roots* :

1. A pinkish caterpillar boring irregular channels through the crown and larger roots, causing them to wither and die.
Strawberry Root-Borer (Anarsia lineatella).

2. A white grub boring downwards from the crown.
Strawberry Crown-Borer (Tyloderma fragariae), Fig. 56.

3. A large white grub eating the roots.
May Beetle (Lachnosterna fusca).

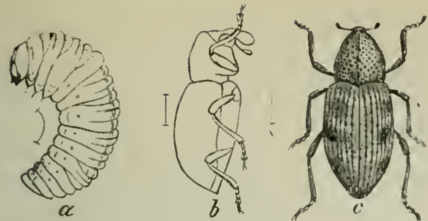

Fig. 56. Strawberry Crown-Borer; *a* the grub, *b* side view and *c* back of the beetle.

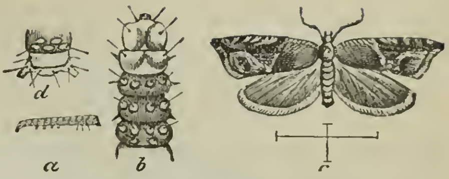

Fig. 57. Strawberry Leaf-roller; *a* natural size; *b* anterior and *d* posterior parts of body, much magnified; *c* moth, magnified.

B. *Attacking the Leaves*:

1. Brownish caterpillars in June and August rolling the leaves into cases, and fastening them with silk.

   Strawberry Leaf-Roller (Phoxopteris fragariae), Fig. 57.

2. Young plants gnawed off at the surface.

   Cutworms.

3. Small, pale spotted, active beetles riddle the leaves with holes in June.

   Spotted Paria (Paria-6-notata).

4. A small, active, jumping striped beetle eating holes in the leaves.

   Striped Flea-Beetle (Phyllotreta vittata), Fig. 58.

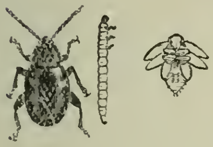

Fig. 58. Flea-beetle and larva.

5. 20-legged grubs eating holes in the leaves.

   Strawberry Saw-Fly (Emphytus maculatus), Fig. 59.

C. *Attacking the Fruit*:

1. A caterpillar feeding on the berry.

   Stalk-borer (Gortyna nitela).

2. A minute black bug, producing a "buggy" odor when eaten with berry.

   Flea-like Negro-bug (Corimelæna pulicaria).

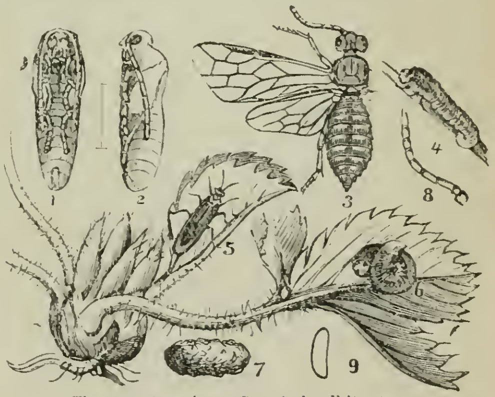

Fig. 59. Strawberry Saw-fly in all its stages.

COLLECTING AT LIGHT IN MANITOBA.

BY A. J. DENNIS, BEULAH, MAN.

The opening of the season of 1902 was not very good with regard to collecting, although I took a few specimens of moths from sallow bloom, such as *Orthosia lutosa*, *Agrotis ypsilon*, *Tæniocampa rufula*, and a few others that I do not yet know the names of; nor have the early spring butterflies been at all common for the past two seasons. In some years I have seen *Erebia discoidalis* and *epipsodea*, *Chionobas alberta* and *varuna*, *Lycæna rustica*, *lygdamus* and *sapiolus*, very thick upon the prairie, but for some reason during the last two seasons they have almost failed me.

There was, however, one night last summer which I wish most particularly to mention as it may interest some of my fellow collectors. It was the greatest evening for collecting I ever had and a time that will never be forgotten. During the spring and early summer, I had been living on what is called "the Hooper plains," on light land, and such land is not good for collecting, not having enough vegetation. To explain what I mean by light land is that open prairie can be seen for miles around, the grass very thin and never green for more than six weeks or two months, with a few plants, but not enough to support a large amount of insect life. It is, however, just the place for *Chionobas alberta*, *C. varuna and Lycæna rustica*. But to revert to the 11th of June, for that is the date I wish to mention.

I left the plains in the afternoon to go to the heavy land, or what is called "the bluffs." Before starting, I packed up my collecting outfit, consisting of a large sheet, a good strong stable lantern killing bottles and my net. Through forgetfulness I left my chloroform behind —a mistake which I afterwards regretted, as it caused me to lose a large number of specimens which I should otherwise have taken. The day had been somewhat close, heavy black clouds passed overhead, and it looked very much like an impending storm. Towards evening, rain began to fall and lightning could be seen in the distance. I had a few things to do when I reached my destination, and before they were finished numbers of insects could be seen on the wing, especially fire-flies, which were very thick, and mosquitoes, which were thicker,—to use an old saying, "as thick as hairs on a cat"! After a time, I noticed the moths on the move, and that was a warning, which made me look round for a quiet corner where I could hang my sheet. Within a few feet from the stable, I found two aspens about the same distance apart as the width of my sheet. That is the place for me, I thought, and I at once proceeded to clear with my axe the lower limbs and any other scrub which might impede my movements. After getting the sheet in position, I had to arrange a pole to hang my lantern on; this being finished, I was ready for action. It was then about half-past eight o'clock. To make myself comfortable, I brought out a chair and put on a macintosh as it was drizzling with rain; then sitting down, I was ready to capture anything that came near.

Very soon a little white Geometer began to arrive, then others, and soon after nine o'clock the Noctuids made their appearance. I caught a few, such as *Hadena modica*, *H. arctica*, *Mamestra rosea*, *imbrifera*, *trifolii*, *meditata* and *purpurissata*, *Xylina signosa*, several species of *Chorizagrotis* which all seemed to be different, *Peridroma astricta*, etc. I also took specimens of *Spilosoma virginica*, *Ichthyura vau*, *strigosa* and *albosigma*, *Nadata gibbosa*, *Lophopteryx elegans*—one a beauty, *Pheosia rimosa*, *Cerura cinereoides*, and many others whose names I hope to give at some future time.

Between half-past nine and ten, the Hawk-moths began to show up. First a single one, then a pair, and very soon a dozen were bobbing about. Some flew straight to the sheet and remained there until I took them off, while others kept flying around the lantern pole. This was rather a drawback as it dazzled my eyes, trying to jump from one side to the other. Soon matters became very lively—Hawk-moths in all directions, and it kept me busy taking them from the sheet. I counted at one time about a score of *Smerinthus geminatus* on the sheet besides numbers that were buzzing about in the grass and darting around the lantern ; later on in the evening there must have been fifty in sight at once. I was now kept busy all the time till at last it was not safe to put any more in my bottles, so I went into the house and waited for a while until I thought my captures were all dead. Then I emptied them into a small box and went out after some more. To my surprise they were as thick as ever—some on the sheet, others flying into the grass, then up again, around the pole, across to the shed, back once more, striking the lantern, then down into the grass. It did not take me long to refill my bottles and I then stopped, well satisfied with my evening's work. If anyone had begun to collect when I left off, he might easily have caught a hundred Sphinges, besides Noctuids and Geometers without number. Now was the time that the chloroform was missed, for if I had not forgotten it, I should have put in another hour, as it was such great fun and only twelve o'clock.

When I returned to the house, the first thing I did was to look at my captures and I was surprised to find some of them moving, so I put them all into the bottles until the morning. One great mistake was made in not capturing all the *Smerinthus geminatus*, for by not doing so I lost a good many fine *S. cerysii*. Not knowing how to distinguish them, I thought them all *geminatus*, therefore I did not bother about them as *Sphinx albescens* was to me more desirable. *Cerysii* must have escaped me very often, as I was not aware that it was taken in Manitoba, and it came to me as a surprise when Mr. Frank of the American Entomological Co. informed me that I had sent him *cerysii* under the name of *geminatus*.

It is very strange that only five species of Hawk-moths turned up that evening, viz., *S. albescens*, *Paonias myops* and *excæcatus*, *S. geminatus* and *cerysii*, considering that I have found twenty-five distinct species of the larvæ. These I have fed and reared as far as the pupa state, but then there came a full stop, for I can never get them any further. There is something in my treatment that does not suit them and which I do not yet understand, for I have good success with all other kinds that I rear.

FLY TORMENTORS OF NEW ONTARIO.

By Tennyson D. Jarvis, B. S. A., Demonstrator in Biology at the Ontario Agricultural College.

On the 15th of June of the current year, in company with Mr. G. F. Kay and H. J. Davis, I left Sudbury on an exploration trip through Northern Ontario. We proceeded by way of C. P. R. to Metagama and thence almost due north by canoe and portage to Night Hawk Lake, a distance of some 200 miles. After spending about six weeks in the region between Nighthawk Lake and the Lower Abitibi we returned by Blanche River and Lake Temiscamingue to the Upper Ottawa, and thus back to civilization. (See map, Fig. 60.)

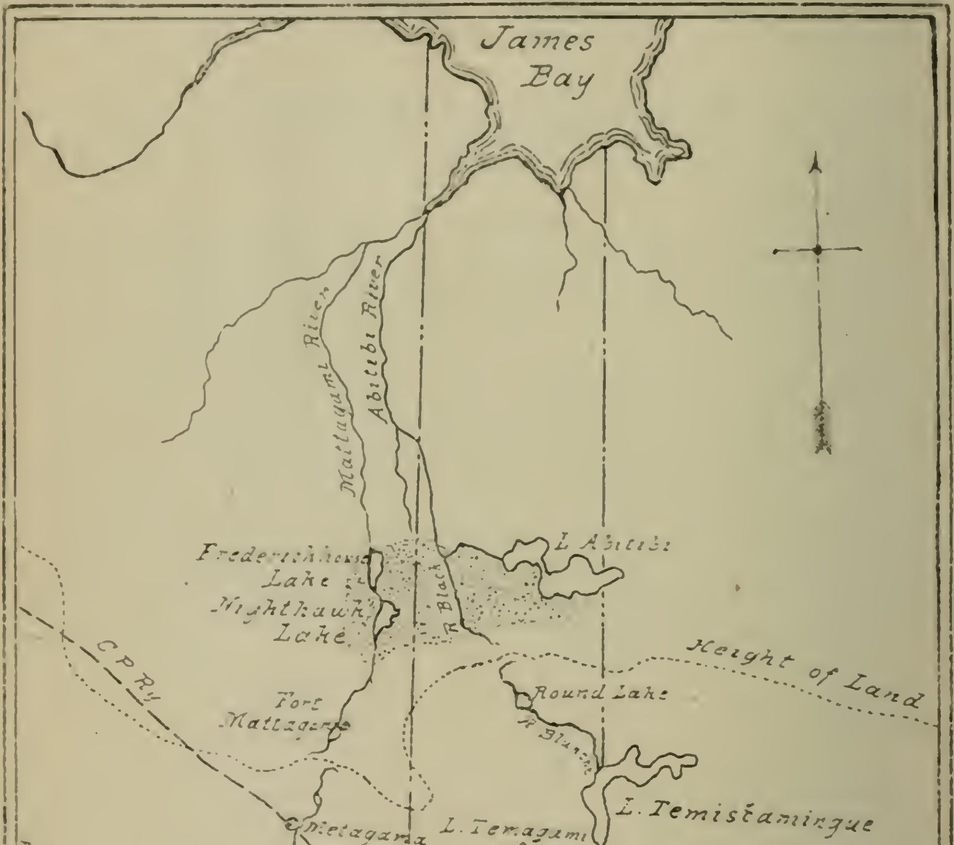

Fig. 60. Map of Northern Ontario.

Throughout the whole trip we were constantly pestered by flies of various species, and I shall endeavour in this paper to convey some idea of the habits of these fly-tormentors, and our experience with them.

MOSQUITOES.

The level wooded country of the Abitibi region abounds in swamps, marshes and muskegs, which form ideal breeding places for mosquitoes, and mosquitoes are there in millions. They proved to be the most troublesome pests which we encountered during our trip. The proverbial busy bee which labors all day long is not to be compared with them. They are busy—exceedingly busy—24 hours a day. They began to be very annoying soon after we took to our canoes at Metagama and from that time until we reached Mattawa on our return there was no respite. It would be practically impossible to convey an adequate idea of the suffering which we were obliged to undergo from their attacks, and no application of oil or salve to our hands and faces seemed to have any effect in keeping them off.

Each night after pitching our tent and banking it around with earth to keep the mosquitoes from entering at the bottom we started a smudge to drive out those within. Then after entering and carefully closing the tent, we burned insect powder which seemed to stupefy them and drive them to the walls, where we scorched numbers of them with candles. We then betook ourselves to our blankets and to sleep, only to awake within an hour to find them as numerous as ever, and as hungry. After a few nights' experience we learned that a smudge only caused them to settle on the ground among the grass and moss, where they remained until the smoke escaped, and then began their ravages again. On making this discovery we tried driving them out by using coats or other clothing as batons, and we found this more effectual.

On one occasion my powers of endurance were severely tested when I undertook to make bread while the other members of the party were out of camp. When I got both hands into the dough the mosquitoes took advantage of the opportunity and pounced upon my defenceless head. At another time we were obliged to spend a night among the islands on Nighthawk Lake. We pitched our tent and made preparations for the night, but after vain attempts to sleep we were forced to paddle to another island in search of a place where the mosquitoes were not so numerous. After travelling from island to island for some hours we finally landed on a very small island of bare rock, where the wind had a free sweep Here we spent the remainder of the night in comparative peace. We repeatedly observed that the mosquitoes were not so troublesome when there was a breeze blowing. Although they were very annoying at all times they were probably most active on cloudy days and at a temperature ranging from 45° to 70° F. They were more numerous on land than on water, but we were always accompanied by a swarm even when far from shore. They appear early in June and continue until September frosts.

I was surprised that we did not occasionally meet with Indians in the woods. On inquiry I learned that they never hunt during the summer months when flies and mosquitoes are out, but congregrate at the forts where they can protect themselves to some extent from the insects by building smudges, thus keeping the atmosphere constantly ladened with smoke. Even the dogs have learned to creep close to the smudges for protection. If the Indians, who have inhabited these regions for ages, find it impossible to go abroad during fly season, imagine what we poor unacclimatized pale-faces must have suffered. Sometimes the mosquito bites were postively agonizing. One day when some distance from camp we wished to cook some fish for dinner. We had but a single match and while I was trying to light the fire with this a mosquito bite caused me such instant pain that dropped the match, and we were obliged to content ourselves with a cold meal.

It was part of my duty to make careful notes of my observations of animals, insects, plants, and soils as we travelled. I found this a most difficult task as the mosquitoes were such a constant annoyance. Let it be remembered that while the hands and face were the special points of attack, the mosquitoes did not limit themselves to these exposed parts, but would even insert their probosces through our thick duck trousers and suck the blood to their hearts content

Black Flies.

Next in importance to the mosquitoes may be mentioned the Black Flies, (*Simulium*). These are small black insects about one eighth of an inch in length with stout bodies and bulging thoraxes. The mouth parts are very curious, and Prof. J. B Smith has ascertained that the females, which alone suck blood possess, besides the usual sucking organs, genuine biting mandibles. Unlike the mosquitoes they breed in rapidly flowing water. Although the bite of these flies is not poisonous it is very severe, drawing blood freely. I frequently noticed the faces of my companions streaked with blood, the result of fly bites. We experienced the greatest discomfort from these flies on bright warm days, and between 9.00 a.m. and 9.00 p.m. They did not bother us much during the hours of darkness but seemed to congregate on the walls of the tent in search of light. They were not attracted by lamp light. While the bites of the black flies were very painful, we also suffered from their getting into our nostrils, our ears, and under our eyelids. We also experienced much inconvenience by their congregating in large numbers in soup, gravy, and other articles of diet. This vexed our jovial half-breed cook so much that he once remarked that he would not mind cooking for us if he could only board somewhere else himself.

At one time the back of my neck was so much lacerated by fly bites that it became stiff and swollen, and I was unable to turn my head for several days. Heavy applications of carbolic salve to the face and hands seemed to prevent the attacks of these flies to some extent I observed that they were troublesome not only to man but also to the dogs deer, and other animals, and that they were more active in June and July than later in the season.

Sand Flies.

Sand Flies, (*Ceratopogon*). These flies are very small yellowish insects, with transparent whitish colored wings having somewhat darker spots. I found great difficulty in capturing specimens as it was impossible to handle them without crushing them. By placing a green leaf on the back of my hand and by allowing them to crawl on it, I succeeded in securing a number, by folding the leaf and inserting it into a cyanide bottle.

The bites of these insignificant looking insects are very poisonous, causing much swelling and a painful burning sensation. Though the sand-flies look insignificant they never allow one to be ignorant of their presence day or night. They adhere very closely to the skin ; they crawl up under shirt sleeves and trouser legs, and keep the whole surface of the body in a constant state of irritation. Unlike the Black-Flies they are attracted by lamp light or fire light, and are therefore very troublesome around the camp fire. We found them always most numerous in the vicinity of rapids or water-falls. They are active throughout the summer, but most troublesome during the latter part of July and August.

Deer Flies (Chrysops). Are large flies about half an inch in length. We found them very numerous in July and experienced much discomfort from their attacks. The bite is not poisonous but causes a sharp severe pain. They are not troublesome excepting on clear, hot days. These flies attack deer and moose as well as man.

Bull dog Tabanus (Tabanus affinis). This was the largest of the fly-tormentors of the north The Bull-dog Tabanus, like the Deer fly, was only troublesome on clear, hot days in June and July. I shall never forget the first bite I received from this fly ; the pain was so sudden and intense that I thought my end had come. One hot, clear day I counted as many as twenty-seven of these large pests attacking one of my companions.

In conclusion let me say that, although the various species of flies above described are exceedingly troublesome at the present time, it is altogether probable that as the country becomes cleared and drained and the soil cultivated, they will largely disappear and life will then be as tolerable in this region as in the older part of the province.

ENTOMOLOGICAL RECORD, 1903.

By Dr. James Fletcher, Ottawa.

The collecting season of 1903 was in most parts of Canada cool and disappointing; but, as is usually the case, persevering collectors made many interesting captures.

Judging from correspondence, the publication of the Entomological Record has had a most stimulating effect upon the study of entomology in Canada. Collectors can now learn the names and addresses of all the leading local collectors and students of the different orders of insects. The publication of records of captures of rare species, or those which have occurred either beyond their known range or at unusual seasons of the year, has also given much valuable information concerning the geographical distribution and life histories of many species. From exact information of this nature, some important collecting expeditions have been made by specialists, which have aided much toward the accurate working up of our Canadian insect fauna. Our collectors have also benefited much from being brought into correspondence with leading authorities outside our borders.

A great many notes of captures have been sent in—some of these, it is true, rather late in the year to be made the best use of, because in certain cases, records required confirmation before publication. A few correspondents considerately sent in their lists month by month, which has been a great assistance to the compiler, who here expresses his gratitude, making special mention of Messrs. Taylor, Harvey, Heath, Hanham, Criddle and McIntosh. It is much easier to make full use of these lists than of those which come in at the end of the season and are then, as a rule, hurriedly made up with few data. The exact locality and date are essential, and when, besides, notes are added as to the food plant or habitat, the record is very much increased in value.

A constant effort has been made to credit each collector with the capture of any species recorded—not only for his own sake, but so that anyone interested in a particular species may know to whom he can write for further information.

As anticipated in the last issue, there has been a great increase in the amount of special work done in Canada in 1903.

It is again my pleasing duty to gratefully acknowledge the invaluable help which has been given Canadian collectors in all parts of the Dominion by the leading American and Canadian specialists of the various orders of insects. No words can overstate the obligation we are under to such men as Dr. J.B. Smith, of New Brunswick, N J.; Dr. L.O. Howard, the U.S. Entomologist, Dr. Harrison G. Dyar, Mr. D. W. Coquillet and Dr. W. H. Ashmead, of Washington; also to Dr. Henry Skinner, of Philadelphia; Mr. E P. Vanduzee, of Buffalo; Prof. H. F. Wickham, of Iowa City, Iowa, and Mr. W. H. Harrington of Ottawa, Ont. These gentlemen have, in the most patient and generous manner, examined and named thousands of specimens for struggling collectors, who, without their help, might,—as so very many before them have done,—have given up the study of insects altogether, because, having no one to tell them anything about their captures, they first became discouraged and then lost all interest in the subject.

I again take the liberty of reminding my colleagues of the great importance, when sending insects to specialists for identification, of always submitting a good series of specimens for examination, when possible, and, further, that every effort should be made to provide such a friend with any specimens which he may indicate as desirable. In exchanging, a cardinal principle is that generosity is a policy of equal value with honesty.

There is a continued and satisfactory increase in the attention which is being given to the study of insects in our public schools, and naturally this has been fostered by the different members of the Entomological Society in their own localities. There is also a constant demand for addresses before schools upon the habits of insects. In this connection, work of special value has been done by Mr. Percy B. Gregson in the public schools of north-western Alberta.

At the Ontario Agricultural College, under Prof. Wm. Lochhead, all the students of the second year receive instruction in economic entomology for half a year. The chief insect pests of the farm, orchard and garden are discussed, and practical exercises are given, so that students may become well acquainted with the forms discussed in the class. All the third year students receive instruction in entomology throughout the year, and in the springtime some of the students are directed specially to work out the life histories of several species of insects. In the fourth year entomology is studied only by those specializing in biology or horticulture. When they graduate, these students are practically acquainted with many of the insects of economic importance, as well as, of course many others.

Several members of the North west Territorial Natural History Society have done excellent work of a scientific nature in collecting and studying the insects of their respective districts. Mr F. H. Wolley-Dod's investigations among the Noctuidæ are of special value, and his extensive collection is a source of reference, of which, through his kindness, several students avail themselves. Mr. T. N. Willing, the Territorial Weed Inspector, in his travels through the North west, has made, during the past year, large collections, with careful notes, in all orders of insects. It has been impossible to work up all of these as yet, but many species of great interest have been secured. Mr J W. Cockle, at Kaslo, B.C.; Messrs. A. W. Hanham and E. M. Anderson, at Victoria, B C.; the Messrs, J. and T. Wilson, R. V. Harvey and A. H. Bush, at Vancouver, B C , and Messrs G. W. Taylor and T. Bryant, at Wellington, B.C., have continued to collect energetically during the past season, and have added many rare species to the Provincial list Mr E. P. Venables has devoted most of his time to economic entomology. In Manitoba good work has been done by the Messrs. Criddle, of Aweme; Mr. E. F. Heath, of Cartwright; Mr. L. E. Marmont, of Rounthwaite, and Mr. A J Dennis, of Beulah. The Ontario collectors have been more active than usual. Except at Montreal, not much work has been done in the Provinces of Quebec and Nova Scotia, but Dr. Schmitt, on Anticosti Island, and Mr. W. McIntosh, of St. John, N.B., have continued to prosecute their studies vigorously.

Probably the event of most importance in 1903, as affecting our knowledge of the insect fauna of a most interesting and little explored part of Canada, was the visit of three months paid by Dr. Harrison G. Dyar, with two assistants, Messrs. A. N. Caudell and R. P. Currie, to Kaslo, on Kootenay Lake, B.C., during the collecting season. I had the pleasure of visiting my friend, Mr. J. W. Cockle, the enthusiastic entomologist of Kaslo, when these gentlemen were staying with him, and seeing their methods and some results of their work. Not only from the early hours of daylight, but throughout the day and late into the night, the work of collecting and studying life-histories went on incessantly. Besides insects in various orders, over 20,000 lepidoptera were collected, and nearly 200 kinds of larvæ were observed. On his way home, Dr. Dyar visited several of our most active collectors of insects in British Columbia, and gave them much help in the identification of unknown species in their collections. Dr. Dyar intends to prepare an extensive report on his summer's work, which must necessarily be of the keenest interest to all of our entomologists. Kaslo, itself, is a locality presenting exceptional attractions to the naturalist; situated on the lake shore, it provides easy means of access to many mountains which have never been explored. Regular steamboats give opportunities of visiting other localities on the extensive Kootenay Lake, and a railway takes one in a few hours right into the heart of the mountain forests. An expedition to the summit of Mount Kokanee (11 000 feet) produced many rare plants and insects. The ruling genius of the place is Mr. Cockle, a genial friend and a most enthusiastic and indefatigable collector, who has discovered many species new to science.

LITERATURE.

Bibliographical notes on works dealing with insects appear regularly in all the standard entomological journals and scientific magazines, such as *The Canadian Entomologist*, *The Ottawa Naturalist*, *Le Naturaliste Canadien*, *Entomological News*, *The American Naturalist*, *Psyche*, *Science*, *Journal of the New York Entomological Society*, etc. These are all indispensable to the working naturalist.

In addition to these, some notable books have appeared during the past year, which will be great helps and time-savers to collectors and students.

DYAR, H.G. List of North American Lepidoptera. United States National Museum, Bull. No. 52.—Undoubtedly the most important book of the year is Dr. Dyar's Catalogue. This large work of 740 pages, prepared with great care and beautifully printed on good paper, has been distributed, free of charge, with the greatest liberality by the Smithsonian Institution to all applicants It is, therefore, in the hands of all of our active workers, and will doubtless be for a long time the guide for classifying and arranging collections. There will, of course, be many points upon which some will differ from Dr. Dyar, both as to arrangement and as to specific reference of some well known names. Some of our more conservative workers will prefer to retain the names of Prof. J. B. Smith's list, particularly as a new edition has recently appeared ; but for the most part, for various reasons I believe Dr. Dyar's list will be accepted by North American entomologists. In the section dealing with diurnal lepidoptera the careful and painstaking work of Dr. Scudder on genera has received more recognition than has previously been accorded it, although in the main Dr. Henry Skinner's catalogue has been followed as to species. The Sphingidæ are arranged as by Dr. J. B. Smith's monograph, and naturally, in the Noctuidæ, Dr. Smith, our highest authority, has been followed. The manuscript of the Geometridæ and the Phycitinæ and of the Pyralidæ was prepared by the late Dr. G. D. Hulst, the remaining subfamilies of the Tineoidea, together with the Pterophoridæ and Tortricidæ, by Dr. C. H. Fernald. Mr. August Busck, the eminent Tineidologist, helped much in the Tineid groups proper and the Gelechiidæ.

It will thus be seen that Dr. Dyar added to his own vast knowledge of the Lepidoptera of North America the latest views of all the leading specialists in the various groups, and, as was well said by Dr. Bethune, the editor of the *Canadian Entomologist*,* "the preparation of this list has evidently involved a very large expenditure of time and labour ; we must all acknowledge that the author has placed us under a deep debt of obligation to him. The work, notwithstanding any criticism that may be passed upon it, is an extremely valuable one, and will be found by its possessors to be most useful and, indeed, indispensable. Though we may not agree with it on all points, we must admit its excellence and importance, and we beg to congratulate the author on his achievement, and thank him for what he has accomplished."

Prof. Grote's articles in the *Canadian Entomologist* for 1903, should be read carefully concerning some of the species mentioned in Dr. Dyar's list.

It will be noticed by our readers that an asterisk (*) has been placed before the serial numbers to indicate species not represented in the U. S. National Museum, and it is sincerely hoped that Canadian collectors will not be slow to show their appreciation and gratitude to the authors and the Smithsonian Institution by sending many specimens of northern insects to fill gaps in the magnificent collection at Washington, which is at the disposal of students from the whole world, and where the utmost care is taken for the preservation of the specimens from injury of all kinds.

BEUTENMUELLER, WM. Descriptive Catalogue of the Noctuidæ found within 50 miles of New York City. Part ii., Dec. 1902. -This is a most useful pamphlet of 46 pages, prepared in the author's usual careful manner, and gives good figures and short descriptions of many of the moths and their larvæ which the beginner has difficulty in identifying. Four plates give beautifully executed figures of 85 species, from drawings of E. L. Hyatt.

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*Can. Ent., 1903, p. 142.

Beutenmueller, Wm. The Hawk moths of the vicinity of New York City, pp. 31.—This is another most useful pamphlet, which will be of inestimable value to beginners on account of the particularly good illustrations which accompany the descriptions of each of the 48 species mentioned.

Fernald, Mrs. M. E. A Catalogue of the Coccidæ of the world. Mass. Agr. Coll., Special Bulletin, No. 88, pp. 360.—This will be found a most useful book of reference for all students of the Coccidæ. It is the result of nearly 25 years of painstaking labour by a well known and eminent entomologist. One thousand five hundred and fourteen species are listed with full bibliographical references. The notes on food plants and geographical distribution of the species are most helpful.

Blatchley, W. S. The Orthoptera of Indiana, 8 vo., pp. 348.—This is practically a concise and popular manual of the Orthoptera of Indiana. It will be found of the greatest help to all, whether they live in Indiana or Canada, who may wish to take up the study of this very important, but much neglected order.

Smith, J. B. Check List of the Lepidoptera of Boreal America, June, 1903.—There is no man living, who has done more for the struggling students of entomology in Canada than everybody's friend, Dr. J. B. Smith. His patience, kindness and prompt attention in identifying species and to all applications for information are unexcelled. The recent appearance of a new edition of his Check List immediately following Dr. Dyar's Catalogue will therefore place many students in a difficult and uncertain position. The question will be: Whose arrangement are we going to adopt? and this, each one must settle for himself. In the first place, everyone should get the check list, then find out the differences and try and decide whether the changes were advisable. In this way, at any rate, much valuable knowledge will be acquired. Dr. Smith is a close student and a frank correspondent, always willing to discuss fairly any problem submitted to him.

Holland, W. J. The Moth Book. Doubleday, Page & Co., New York, $4.00.—Just as we are going to press, the much looked for Moth Book has come to hand. It is a handsome volume, uniform with the Butterfly Book and the Insect Book, excellently printed and profusely illustrated with 48 magnificent coloured plates giving 1,500 figures of North American moths. These alone are worth far more than the whole price of the book. The letter press, as must necessarily be the case when such an enormous field is covered, will be found disappointing to a certain degree, not so much for what is given as for the lack of the further information which is necessarily omitted. As the author himself states in the preface, "The brevity in description is, however, abundantly compensated for by the illustrations." There are over 300 text cuts, besides the coloured plates. Some of these are excellent, but others seem hardly up to the quality of the rest of the book. Unfortunately, this book again has a somewhat different nomenclature from either of the publications by Dr. Dyar and Dr. Smith referred to above. The reasons for some of the changes are given, which will help the student to correctly understand the true nature of many genera; but beginners, finding such wide differences of opinion between leading authorities, will, it is to be feared, be for some time at any rate considerably confused. This difficulty, however, must necessarily stimulate much original thought and investigation, which will eventuate in a better knowledge of North American systematic entomology. On the whole, the Moth Book will be found one of the most useful accessible publications which has ever appeared upon American entomology.

Felt, E. P. Aquatic Insects in New York State. (N. Y. State Museum, Bull. 18, Entomology). This is a sumptuous volume of 500 pages lavishly illustrated with 52 beautifully executed plates and a few text-cuts. It is a study at the Entomological Field Station, Ithaca,

N. Y., under the direction of Dr. Felt, by the well known specialists, Dr. J. G. Needham, A. D. McGillivray, O. A. Johannsen and Dr. K. C. Davis. It adds enormously to our knowledge of aquatic insects and is a publication replete with information, a large part of which is altogether new.

SPECIALISTS.

The record this year is again chiefly made up of notes on lepidoptera and coleoptera. Extensive lists of diptera have been sent in by Mr. Harvey, of Vancouver, and Mr. McIntosh, of St. John and many other collectors in different parts of Canada have material now under examination. With regard to hemiptera, Mr. Stevenson, of Montreal, Mr. Metcalfe, of Ottawa, Mr. Hanham, of Victoria, and Mr. Taylor, of Wellington, have made large collections, which are now being worked up by Mr. Van Duzee and other specialists. I hope to give a considerable amount of space next year to these two orders. The orthoptera have been studied to a considerable extent by Mr. T. N. Willing, and Mr. N. Criddle in the West, by Mr. E. M. Walker in Ontario and by the Rev. Dr. Fyles in Quebec.

Of those making a special study of certain groups or orders, the following may be mentioned, so that anyone wishing to help them in their studies by sending material for examination or wishing to correspond may know of them. A sufficient address is given for each in the list of active workers herewith.

Life-histories—Messrs. Lyman, Brainerd, Fyles, Young, Gibson, Fletcher, Cockle.

Diurnals—Messrs. Lyman, Wolley-Dod, Fyles, Willing, Marmont, Hanham, Heath and Fletcher.

Nocturnals—The genus *Hydrœcia*, Messrs. Lyman, Winn, Norris and Brainerd, Montreal. The genus *Apantesis*, A. Gibson, Ottawa. The genus *Paragrotis* (*Carneades* and *Euxoa*) and its allies, F. H. Wolley-Dod, Millarville. The Geometridæ of North America, Rev. G. W. Taylor, Wellington; Mr. Taylor has corresponded with all interested in this family and has now amassed an enormous collection, probably one of the largest on the continent. He has worked these up from the descriptions and is now ready to assist anyone who will send him material.

ACTIVE WORKERS.

The following list gives the names of the most active workers in Canada which have been heard from during the past year. There are doubtless many others, but I have not heard from them during 1903. The initials in parentheses after their names indicate the orders they are studying, or if they have general collections.

Anderson, E. M., Victoria, B. C. (L.)
Bethune, Rev. C. J. S., London, Ont. (Gen., L., C.)
Bégin, Rev. P. A., Sherbrooke, Q. (Gen.)
Bice, J. London, Ont. (L.)
Baird, Thomas, High River, Alta. (Gen.)
Browne, Edgar J., London, Ont. (L., C.)
Brainerd, Dwight, Montreal. (L.)
Bryant, Theodore, Wellington, B.C. (L.)
Burman, Rev. W. A., Winnipeg. (Gen.)
Bush, A., Vancouver, B. C. (L.)
Chagnon, Gus., Montreal. (D.,C.)
Cockle, J. W., Kaslo, B. C. (L.)
Criddle, N., Aweme, Man. (L., Or., C.)
Crew, R. J , Toronto. (C.)
Dennis, A. J., Beulah, Man. (L.)
Desrochers, Rev. J. E., Rigaud, Q. (L., C
Dod, F. H. Wolley-, Millarville, Alta (L.)
Draper, R., Vancouver. (L.)
Evans J.D.,Trenton,Ont. (Gen ,L.,C. Hym
Fanshawe, Lyonell, Tamarisk, Man. (L.)
Findley, Rev. G. H., Ainsworth, B. C. (L)
Fletcher, Dr. J., Ottawa. (Gen., L., C.)
Fyles, Rev. Thos. W., Levis, Que. (Gen., L., Hym.)
Garrett, C., Didsbury, Alta. (L.)
Gibbon, H., Beulah, Man. (L.)
Gibson, Arthur, Ottawa. (L., Gen.)
Grant, C. E., Orillia, Ont. (L.)
Gregson, P. B., Blackfalds, Alta. (Gen.)
Guignard, J. A., Ottawa. (Gen , Hym.)
Hanham, A W., Victoria, B C. (L.,D.,C.)
Harrington, W. H., Ottawa. (C., Hym., Hem.,D.)
Harvey, R. V., Vancouver. (L., Odon.)
Heath, E. F., Cartwright, Man. (L.)
Huard, Rev. Victor, Quebec. (Gen.)
Hudson, A. F., Calgary, Alta. (L.)
Jones, W. A. Dashwood, New Westminster, B. C. (L.)
Keen, Rev. J. H , Metlakatla, B. C. (C.)
Lochhead, Prof. W., Guelph Ont. (Gen., Or.)

Lyman, H. H., Montreal (L.)
McIntosh, W., St. John, N. B. (L., D., C.,
MacLaughlin, T. J., Ottawa. (Odon.)
Marmont, L. E., Rounthwaite, Man. (L.)
Metcalfe, W., Ottawa (L., C., Hem.)
Moffat, J. A., London. (L.)
Moore, W. W., Montreal. (Hem.)
Morden, J. A., London, Ont. (L.)
Parsons, C., London (L., C.)
Perrin, Jos., Halifax. N. S. (L.)
Norris, A. E., Montreal. (L., Hem.)
Ouellet, Rev. C. J., Montreal. (C., Hym.)
Richard, A. E., Ottawa (L.)
Roy, Rev. Elias, Levis, Q. (C.)
Sandercock, W. C., Lauder, Man. (L.)
Saunders, H. S., Toronto (L.)
Simpson, Willibert, Ottawa. (C.)
Sutheld, J. D., Morden, Man. (L.)
Sanson, N. B., Banff, Alta. (Gen., L.
Schmitt, Dr. J., Anticosti. (Gen.)
Stevenson, Charles, Montreal (L., C., Hem.)
Tanton, J., London, Ont. (L.)
Taylor, Rev. G. W., Wellington, B. C. (L., Hem., C.)
Tipping, Dalton, Blackfalds, Alta. (Hym. Gen.)
Venables, E. P., Vernon, B. C. (L., C., Hym.)
Walker, E. M., Toronto. (Or. Odon.
Winn, A. F., Montreal. (L.)
Wilson, E., Vancouver. (L.)
Wilson, Jno., Vancouver. (L.)
Wilson, T., Vancouver. (L.)
Wilson, W. J., Ottawa. (Gen.)
Williams, J. B., Toronto. (L.)
Willing, T. N., Regina. (L., Or., C.)
Young, C. H., Hurdman's Bridge, Ont. (L.)

NOTES OF CAPTURES

LEPIDOPTERA.

*(Arranged according to Dyar's List of North American Lepidoptera, U.S.N.M., Bull. No. 52.)**

RHOPALOCERA.

(Dyar's number.)

11. *Papilio glaucus*, L., *a. turnus*, L. A typical specimen, Kaslo, B. C., (Cockle).

14. *Papilio thoas*, L., (*cresphontes*). Lakeview, 15 miles from Halifax, N.S., Aug. 1901, (Miss H. King, teste J. Perrin).

16. *Papilio machaon*, L., *a. aliaska*, Scud. Hudson Bay slope. Forget Portage, Nagagami River, 63 miles northward of Montizambert Station, C.P.Ry., and 22 miles north of height of land, measured along the canoe routes, Lat. 49° 12′ 47″, (W. J. Wilson).

18. *Papilio zolicaon*, Bdv. Beulah, Man., (Dennis).

38. *Pontia napi*, L., *g. virginiensis*, Edw. Abundant, Cote St. Paul, Que., May 3 and 10, (Stevenson).

85. *Eurema euterpe*, Men. (*lisa*, Bdv.). De Grassi Pt., Lake Simcoe. One, Aug. 4, (Walker).

95. *Speyeria idalia*, Dru. Grand Bend, Lake Huron, July, (H. S. Saunders).

216. *Eugonia californica*, Bdv. Cartwright, Man., Sept. 5, the only one seen this year, (Heath). Enormously abundant in many parts of the Kootenay country, as at Nelson, B.C., Trail, B.C., and Robson, B.C., (Fletcher). Common here, but millions are reported from Rossland by Danby. The only food plant here is *Ceanothus*, Kaslo, (Cockle).

222. *Vanessa carye*, Hub. Swarming at Vancouver, (Harvey).

271. *Erebia Vidleri*, Elwes. Very abundant on Mt. Cheam, B.C., Aug. 3-8, (Harvey Bush, J. Wilson).

284. *Cœnonympha typhon*, Rott., *a. laidon*. Bork. (*inornata*, Edw). This was recorded in error to have been taken last year at St. Hilaire, Que., by Mr. Stevenson. The specimen was taken at Piedmont, Que.

286. *Enodia portlandia*, Fab. Niagara Glen, Ont., July 1 and 25, (Williams).

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*This arrangement was decided upon after discussion at the Annual Meeting of the Society held at Ottawa in September, 1903.

358. *Thecla spinetorum*, Bdv. Kaslo, June 1, (Dr. H. G. Dyar).
374. *Incisalia irus*, Gdt. Cole Harbour, N.S., June 3, and Halifax, May 17, (Perrin).
383. *Erora læta*, Edw. Meech Lake, Que., two specimens, May 18, (Young).
437. *Rusticus anna*, Edw. Wellington, B.C., July 20, (Taylor).

HETEROCERA.

659. *Lepisesia Clarkiæ*, Bdv. Goldstream, B.C., May 24, June 7. Rare, (Hanham).
803. *Crambidia casta*, Sanborn. Millarville, Alta., (Dod.); Kaslo, (Cockle); Rounthwaite, July 25 to Aug. 25, (Marmont); Brandon, Aug. 27th, (Hanham). Grand Forks, B C., Aug. 10, (Fletcher). Ottawa, Aug., (Saunders and Fletcher).
806. *Lexis bicolor*, Grote. Rounthwaite, August, (Marmont); Nepigon, (Fletcher); Kaslo, (Cockle).
846. *Ecpantheria deflorata*, Fab. London, Ont., (Bethune).
853. *Estigmene prima*, Sloss. Mer Blene, near Ottawa, May 25, (Gibson). This is the form referred to by Mr. Lyman, Can. Ent. xxxiii, p. 93, as the heavily spotted Gormin swamp form and is very different from Mrs. Slosson's type of *prima*.
869. *Neoarctia yarrowi*, Stretch, *a. remissa*, Hy. Edw. One on Mount Cheam, near summit, (J. Wilson).
876. *Apantesis michabo*, Grt. One specimen, May 20, Rounthwaite, (Marmont).
878. *Apantesis parthenice*, Kirby. A beautiful variety of this common arctian was bred by Mr. Marmont at Rounthwaite during the past season, in which, instead of the usual red secondaries, this had them of a rich buff yellow.
879. *Apantesis oithona*, Str., *a. rectilinea*, French. At light, Aug. 5, Rounthwaite, (Marmont); bred from larvæ on *Castilleja sessiliflora*, Aweme, (Criddle and Fletcher).
888. *Apantesis nevadensis*, G. & R., *b. superba*, Stretch. Bred at Ottawa from larvæ sent from Vernon, B.C., (Venables).
934. *Æmilia roseata*, Walk. One specimen emerged June 19 from chrysalis found at Goldstream, V.I., in May, (Hanham); Mission City, B.C., July, (J. Wilson).
996. *Apatela manitoba*, Sm. Aweme, July 1, (Criddle).
1010. *Apatela minella*, Dyar. May 19. Kaslo, (Cockle).
1016. *Apatela falcula*, Grt. Cartwright, June 19, (Heath).
1025. *Apatela ovata*, Grt. At light and sugar, Cartwright, (Heath).
1029. *Apatela sperata*, Grt. St. John, N.B., July 7th, (McIntosh); Aweme, Man., (Criddle); Ottawa, (Young).
1038. *Apatela emaculata*, Sm. Cartwright, May 11, (Heath).
1042. *Apatela lanceolaria*, Grt. July, Rounthwaite, (Marmont).
1052. *Merolonche spinea*, Grt. Kaslo, Aug. 19, (Cockle).
1059. *Jaspidia (Bryophila) teratophora*, H.-S. At light, July 11, Trenton, (Evans).
1073. *Baileya (Leptina) ophthalmica*, Gn. Meach Lake, May 17, (Young).
075. *Baileya Doubledayi*, Gn. Brownsburg, Que, Aug., (Brainerd); Toronto, (Gibson).
1076. *Baileya dormitans*, Gn. June 13, Cartwright, (Heath).
1145. *Hillia crassis*, H-S. At Eight, Ottawa, Sept. 21, (Fletcher).
1148. *Hadena Evelina*, French. Wellington, B.C., (Bryant).
Hadena ferens, Sm. Millarville, (Dod).
1165. *Hadena diversicolor*, Morr. Ottawa, Aug. 27, (Young, Fletcher).
1170. *Hadena tonsa*, Grt. Millarville Rare, (Dod).
1211. *Hadena stipata*, Morr. At sugar, Meech Lake, (Young).
1228. *Hadena plutonia*, Grt. Aweme, July 19, (Criddle).
1246. *Hadena relecina*, Morr. Rounthwaite, Sept. 1, (Marmont). Aweme, (Criddle).
1259. *Polia Theodori*, Grt., *a. epichysis*, Grt. Kaslo, (Cockle).

1261 *Polia confragosa*, Morr. Sept. 29, Oct. 2, at light, Cartwright, (Heath).

1268. *Polia medialis*, Grt. Two specimens had only taken two previously, Millarville, (Dod). Meech Lake, Que. Several specimens 19 & 21 Sept., (Young).

Feralia columbiana, Sm. Can. Ent., 1903, p. 10. New Westminster, B.C., (Dashwood Jones). Several in May. Vancouver, (Bush); Nanaimo, (Harvey).

1411. *Rhynchagrotis costata*, Grt. Victoria, July 18, (Anderson); Kaslo, (Cockle); Wellington, (Bryant).

1412. *Adelphagrotis stellaris*, Grt. Wellington, (Bryant).

Abagrotis ornatus, Sm. Jour. N.Y. Ent. Soc. March 1903, Kaslo, (Cockle).

1426. *Semiophora elimata*, Gn. Ottawa, Aug. 31, (Young); St. John, abundant, (McIntosh).

1427. *Semiophora opacifrons*, Grt. Bred at Ottawa, emerged Aug. 3. (Fletcher).

1440. *Pachnobia Fishii*, Grt. May 24, St. John, (McIntosh).

1449. *Setagrotis vernilis*, Grt. July 25, Kaslo, (Cockle)

1450. *Setagrotis infimatis*, Grt. Wellington, (Bryant).

1455. *Agrotis geniculata*, G. & R. Montreal. (Winn)

1479. *Noctua Treatii*, Grt. Cartwright, June 19, July 22, (Heath); Millarville, (Dod).

1485. *Noctua rubifera*, Grt. Chilliwack, B.C., Aug., (Harvey).

1503. *Noctua plebeia*, Sm. Victoria, Aug. 1, (Anderson); Wellington. (Bryant).

1506. *Noctua substrigata*, Sm. Millarville, rare, (Dod). Regina, (Willing).

1508. *Noctua Calgary*, Sm. Wellington (Bryant); Millarville, (Dod).

1511. *Noctua cynica*, Sm. A very rare species. July 25, at light, Cartwright, (Heath).

1520. *Chorizagrotis soror*, Sm. Sept. 6, Kaslo, (Cockle).

1535. *Feltia robustior*, Sm. Aweme, Aug. 29, (Criddle).

1569. *Paragrotis segregata*, Sm. Always scarce. Sept. 29, Cartwright, (Heath).

1692. *Paragrotis intrita*, Morr. Three specimens. Not seen for years, Millarville, (Dod).

Paragrotis focinus, Sm. Jour. N.Y. Ent. Soc. March, 1903, Calgary, (Dod); Wellington, (Bryant).

Paragrotis maimes, Sm. (Can. Ent. 1903, p. 131, where several other new species of Canadian noctuids are described.) Brandon, (Hanham); Millarville, July 27-Aug. 21, (Dod).

1699. *Paragrotis titubatis*, Sm. Cartwright, July 25, (Heath); Wellington, (Bryant).

1721. *Paragrotis fortius*, Sm. Cartwright, July 25, (Heath).

1734. *Paragrotis colata*, Grt. Mount Cheam, Aug. 9, (Bush).

1756. *Anytus profundus*, Sm. Cartwright, Sept. 2, (Heath).

1793. *Mamestra radix*, Walk. 1 specimen at currant bloom, uncommon. May 31. Cartwright, (Heath).

1797. *Mamestra gussata*, Sm. Cartwright, June 13. (Heath); Winnipeg. (Hanham).

1801. *Mamestra trifolii*, Rott., *a. Oregonica*, Grt. Cartwright, July 22, (Heath); Mt. Cheam, Aug. 6, (Bush).

1813. *Mamestra variolata*, Sm. Victoria, Aug. 1. (Anderson)

1825. *Mamestra Goodellii*, Grt. Cartwright. "This has been hitherto confused with *[illegible]*, Sm.", (Heath).

1830. *Mamestra stricta*, Wlk., *a. cinnabarina*, Grt. Wellington. (Bryant).

1877. *Mamestra circumvadis*, Sm. 2 more specimens of this beautiful species were taken at Aweme on June 27, (Criddle). The record made last year from Cartwright was a mistake, as, so far, it has not been taken there.

1894. *Xylomiges dolosa*, Grt. Meech Lake, May 18. (Young).

1895. *Xylomiges rubrica*, Harvey. Vancouver, April. "This is near *pulchella* but is much paler, is redder and less contrasting in colour." (Harvey).

1896. *Xylomiges perlubens*, Grt. Wellington, (Bryant).

1902. *Xylomiges peritalis*, Sm. Vancouver, May, (Harvey).

Nephelodes tertialis, Sm. Jour. N.Y. Ent. Soc., March, 1903. Winnipeg, Aug. 16-24, (Hanham).

1973. *Heliophila megadia*, Sm. Wellington, (Bryant); Cartwright, "very similar to *insueta*," (Heath).

1958. *Heliophila minorata*, Sm. Cartwright. This is the Manitoban form of *pallens*, (Heath).

1983. *Heliophila Calgariana*, Sm. Wellington, (Bryant); July 25, Victoria, (Hanham).

1998. *Orthodes vecors*, Gn. Ottawa, reared from larva, (Gibson).

2023. *Graphiphora Columbia*, Sm. Millarville, (Dod).

2072. *Aporophila Yosemitæ*, Grt. Millarville, (Dod).

2076. *Pleroma apposita*, Sm. Wellington, (Bryant).

2088. *Xylina dilatocula*, Sm. Wellington, (Bryant). This is a very rare species.

2101. *Xylina Oregonensis*, Harvey. Victoria, April 14, (Anderson).

2126. *Cucullia postera*, Gn. June, Cartwright, (Heath).

2128. *Cucullia florea*, Gn. "At wild currant bloom, June 1, Rounthwaite," (Marmont); Cartwright, June 28, (Heath).

Rancora albicinerea, Sm. Can. Ent. 1903, p, 137. Boucher, Sask., N.W.T., (E. Coubeaux). 6 sp. April 24, Rounthwaite, (Marmont). Head of Pine Creek near Millarville, (Dod).

2154. *Nonagria læta*, Morr. Montreal, Aug. 20, (Stevenson).

2166 *Gortyna stramentosa*, Gn. At light, Aug. 20, Montreal, (Norris, Winn).

2168. *Gortyna medialis*, Sm. Very abundant, Aug. and Sept., St. John, (McIntosh); Millarville, (Dod).

2172. *Papaipema inquæsita*, G. & R. Montreal, Sept., (Brainerd).

2173. *Papaipema speciosissima*, G. & R. At light, Montreal, (Chagnon, Stevenson).

Papaipema Harrisii, Grt. At light, Ottawa, Oct., (Gibson).

2183. *Papaipema cerussata*. G. & R. Montreal. I bred a fine aberration of this species with all the usual spots obscure, (Brainerd). A similar specimen was also bred at Ottawa by Mr. Young. Bred from stems of *Thalictrum*, (Norris).

2188. *Papaipema impecuniosa*, Grt. Montreal, Sept., (Winn). Ottawa, (Fletcher).

2200. *Xanthia pulchella*, Sm. Wellington, (Taylor).

2210. *Pseudoglæa blanda*, Grt. Rare at sugar, Sept. 4 to 15, Victoria, (Hanham).

2220. *Orthosia decipiens*, Grt. Wellington, (Bryant).

2244. *Scopelosoma devia*, Grt. Sept., Rounthwaite, (Marmont); Ottawa, Oct. 17, (Fletcher).

2301. *Heliothis phlogophagus*, G. &. R. (*dipsaceus*, Sm.) Bred, Montreal, (Brainerd).

2395. *Melaporphyria immortua*, Grt. At wild currant bloom, Rounthwaite, (Marmont).

2396. *Melaporphyria prorupta*, Grt. 1 specimen of this beautiful moth was taken at Osoyoos, B.C., by Mr. C. de B. Green some years ago, and has been recently named by Dr. Dyar.

Melicleptria Kasloa, Sm. Kaslo, rare, (Cockle).

2481. *Eosphoropteryx thyatiroides*, Gn. Montreal, (Norris); Ottawa, 2 sp., (Young).

2508. *Autographa vaccinii*, Hy. Edw. Very common, St. John, (McIntosh).

2524 *Autographa corrusca*, Strecker. Hatzic, B.C., Aug., (Draper); Wellington, (Bryant).

2533. *Syngrapha ignea*, Grt. "Commoner than usual," Millarville, (Dod).

2777. *Cirrhobolina deducta*, Morr. July 22, Kaslo, (Cockle).

2784. *Syneda Alleni*, Grt. St. John, June 19, (McIntosh); Aweme. June 20, (Criddle).

2788. *Syneda ochracea*, Behr. July 10, Kaslo, (Cockle).

2825. *Catocala elda*, Behrens. "Not uncommon this year at sugar, but very hard to catch." Sept., Victoria, (Hanham).

2826. *Catocala relicta*, Wlk., *b. phrynia*, Hy. Edw. Ottawa, Sept. 26, (Fletcher). This is a beautiful suffused specimen with the upper wings entirely covered with black scales. If taken on Vancouver Island it would be passed over for *elda*.

2832. *Catocala Frenchii*, Poling. Victoria, a week or ten days earlier than *elda*, (Hanham).

2848. *Catocala unijuga*, Walk., var. *Fletcheri*, Btmr. A new variety, which was collected by Mr. T. N. Willing, of Regina, when living at Olds, Alta., about 60 miles north of Calgary. It is like the typical form in markings, but the bands on secondaries, instead of being red, are of a dark yellowish sooty drab.

2889. *Catocala abbreviatella*, Grt. "Very scarce at sugar," July 25, Cartwright, (Heath).

2923. *Remigia repanda*, Fab. 2 sp. taken at sugar. Never collected at Ottawa before. (Fletcher).

3006. *Erebus odora*, L. Meech Lake, Que., Aug. 2, (Young).

3007. *Thysania Zenobia*, Cram.. 1 sp. at light, middle of August, Renforth, 5 miles from St. John, (McIntosh). (The most interesting capture of the year.)

3091. *Apatelodes angelica* Grt. 1 sp. July 6, at light, Trenton, (Evans).

3117. *Notodonta simplaria*, Graef. "Very rare here, 1 sp. at light, June 29." Cartwright, (Heath).

3146. *Ianassa Coloradensis*, Hy. Edw. July 10, Cartwright, (Heath).

3180. *Euthyatira pudens*, Gn. 3 sp. on dates somewhat apart, April 21, May 11 and 28, Victoria, (Hanham); Kaslo, June 6, (Cockle).

3181. *Euthyatira semicircularis*, Grt 2 sp., June 18 and 25, Victoria, (Hanham).

3185. *Gynaephora Rossii*, Curtis. This rare arctic species has been reared from larv collected on willows in 1902 at Blackfalds, Alta., by Mr. P. B. Gregson. Durin the past summer the larvæ were extremely common on willows and poplars a that place, and several specimens were sent to me by Mr. Gregson and Mr. Dalton Tipping.

3236. *Nyctobia nigroangulata*, Strk. Common in spring, Wellington, (Taylor, Bryant).

3336. *Euchœca albifera*, Wlk. Wellington, (Bryant).

3338. *Coryphista Meadii*, Pack. Wellington (Bryant).

3384 *Mesoleuca ethela*, Hulst. Wellington, (Taylor, Bryant).

3396. *Hydriomena sparsimacula*, Hulst. Wellington, (Bryant).

3405. *Hydriomena costigutta*, Hulst. Common, Wellington. "This species has be going under the name of *Petrophora abrasaria*, H.-S., which it somewhat r sembles." (Taylor.)

3428. *Cœnocalpe Morrisata*, Hulst. New Westminster, (Jones).

3434. *Cœnocalpe topazata*, Strk. Mount Cheam, (Harvey).

3460. *Petrophora convallaria*, Gn. Wellington. "I have been able to separate this fr *P. defensaria*, with which it has been confused. It is much rarer." (Taylor.)

3603. *Epelis truncataria*, Wlk. Aweme, (Criddle). Mr. Taylor writes: "This is qu distinct from *Faxonii*, Minot, which has been placed in synonymy with it b printer's error in Dyar's Catalogue."

3610. *Dasyfidonia avuncularia*, Gn. Several specimens sent from Osoyoos, B.C., by C. de B. Green. This, I think, is the first Canadian record.

3628. *Deilinia fœminaria*, Gn. Cameron Lake, V.I., (Taylor).

3747. *Sympherta tripunctaria*, Pack. Wellington, (Bryant).

3760. *Enemera jutunaria*, Gn. "Common at Cameron Lake, but, so far, not taken elsewhere on Vancouver Island," (Taylor).

3767. *Caripeta æqualiaria*, Grt. Victoria, (Taylor); Kaslo, (Cockle).

3769. *Phengommatæa Edwardsata*, Hulst. Wellington, 1 sp., (Bryant). Rather scarce, Kaslo, (Cockle).

3776. *Enypia venata*, Grt. "Common at Cameron Lake, but not taken elsewhere on Vancouver Island," (Taylor).

3782. *Nepytia phantasmaria*, Strk. "Common at Central Park, near Victoria, Sept and Oct. This is the western representative of *Nepytia semiclusaria*, Wlk." (Taylor.)

3848. *Cleora indicataria*, Wlk. Wellington, (Bryant).

3876. *Apocheima Rachelæ*, Hulst. Rounthwaite, several males, Apl. 15 to 25 (Marmont). Eggs of this remarkable species were received from Mr. Criddle last spring, and full notes of the life-history taken up to the pupa.

3883. *Erannis defoliaria*, Clerck. *a. Vancouverensis*, Hulst Nov. 19, Victoria, (Anderson). "This moth appears to be no longer a common insect here. Single specimens were taken Nov. 23 and 25, none seen last year," (Hanham).

3965. *Euchlæna pectinaria*, D. & S. Not uncommon. Wellington, (Taylor).

4041. *Leucobrephos Middendorfi*, Men. Beulah, Man., April 16, (Dennis).

4055. *Rœselia minuscula*, Zell. At rest on fir tree, May 18, Victoria, (Anderson). Dr. Dyar says that this is an extremely rare insect.

4132. *Thyris lugubris*, Bdv. Rounthwaite, (Marmont). Sandhills near Aweme, flying in bright sunshine, July 20, (Criddle, Fletcher).

4143. *Cossus undosus*, Lint. Kaslo, July 27, (Cockle).

4173. *Podosesia syringæ*, Harr. Hurdman's Bridge, near Ottawa, May 28, (Young).

4406. *Phlyctænia Washingtonalis*, Grt. Plentiful, Goldstream and Oak Bay, June 7 to 17, (Hanham); Victoria, May 20, (Anderson).

4551. *Prionapteryx nebulifera*, Stephens. Aweme, Man., (Criddle).

5912. *Ethmia longimaculella*, Cham. Rigaud, (Desrochers).

6606. *Sthenopis thule*, Strk. Several taken at Montreal South, flying from 8.45 to 9.30, p.m., July 5 to 16, (Mrs. C. Stevenson).

COLEOPTERA.

Cicindelidæ. The Canadian species are now being specially studied by Mr. E. D. Harris, of 280 Broadway, New York, who will be glad to receive specimens from all localities.

109. *Cychrus angulatus*, Harr. Wellington (Taylor); Goldstream, B.C., May 17, one under stone just killed by large black spider, (Hanham).

128. *Calosoma Wilcoxi*, Lec. 1 sp. under stone, Montreal Mountain, July 26, 1902, (A. Denny).

165. *Blethisa multipunctata*. L. May 27, Aweme, (Criddle).

167. *Loricera cærulescens*, L. Laval Co., Que., June 7, (Stevenson).

179. *Notiophilus Hardyi*, Putz. Very abundant, I could have caught hundreds, found under every pile of dead scrub, Tamarisk, Man., (Fanshawe).

189. *Nebria Gebleri*, Dej. Vernon, (Venables).

300. *Nomius pygmæus*, Dej. Goldstream, April 13, under bark of fallen Douglas spruce, (Hanham).

313. *Bembidium nitidum*, Kby. May 7, Aweme, (Criddle).

416. *Bembidium mutatum*, G. & H. April 4, [illegible] May 6, Aweme, (Criddle).

Bembidium fuscicrum, Mots, Aweme, riddle).

646. *Amara carinata*, Dej. St. John, common, (McIntosh).

722. *Dicaelus sculptilis*, Say. April 23, Aweme, (Criddle).

883. *Lebia pumila*, Dej. May 14, Aweme, (Criddle).

889. *Lebia ornata*, Say. 2 sp., July 13, St. John, (McIntosh).

911. *Blechrus nigrinus*, Mann. April 7 and 14, Aweme, (Criddle).

990. *Zacotus Matthewsii*, Lec. Victoria, B.C. In three seasons I have only seen half-a-dozen of these fine beetles, four turned up in my garden and one was taken at sugar in Sept. *Cychrus angusticollis*, and *Carabus Oregonensis* are frequent visitors to my sugar in Sept., (Hanham). I was much surprised to find a specimen of this magnificent Broscid in some miscellaneous material sent to me by Mr. Cockle from Kaslo, B.C., (Fletcher).

1027. *Chlaenius harpalinus*. Esch. Swan Lake, Victoria, (Hanham).

1028. *Chlaenius interruptus*, Harr. Swan Lake, Victoria, in April, (Hanham).

1384. *Ilybius quadrimaculatus*, Lec. Mouth of Skeena River, B.C., (Keen).

1662. *Sphaeridium scarabaeoides*, L. St John, rare, (McIntosh).

3185. *Aphorista vittata*, Fab. 1 sp. under a stone, April, Aylmer, Que., (Gibson).

Pedilophorus Lecontei, Wickham. Can. Ent., 1903, p. 180. Vernon, (Venables).

3883. *Pedilophorus oblongus*, Lec. Vernon, (Venables).

9942. *Hister umbrosus*, Casey. Vernon, (Venables).

3887. *Cytilus sericeus*, Forst. St. John, (McIntosh).

3898. *Syncalypta echinata*, Lec. Trenton (Evans).

4108. *Cardiophorus convexulus*, Lec. Common, St. John, (McIntosh).

4282. *Agriotes fucosus*, Lec. Inverness, B.C., July 20, (Keen).

4287. *Agriotes limosus*, Lec. Common, St. John, (McIntosh).

4382. *Pityobius anguinus*, Lec. Bred from pupa found in old hemlock spruce log, Chelsea, Que., June, (Gibson); St. John, rare, (McIntosh).

4384. *Athous Brightwelli*, Kby. 1 sp., St. John, (McIntosh).

4651. *Chrysobothris scabripennis*, L. and G. July 4, St. John, (McIntosh).

5178. *Clerus sphegeus*, Fab. Vernon, May 23, (Venables).

5275. *Hadrobregmus foveatus*, Kby. Montreal, March 22, (Stevenson).

5327. *Cœnocara Californica*, Lec. Mt. Arrowsmith, B.C., bred from *Lycoperdon*, Sept., (Fletcher)

5456. *Onthophagus nuchicornis*, L. Common, St. John, (McIntosh).

5592. *Odontaeus cornigerus*, Melsh. Ottawa, (Fletcher, Richard); not common, St. John, (McIntosh).

5851. *Cotalpa lanigera*, L. June, Aweme, Manitoba, (Criddle).

6092. *Obrium rubrum*, Newm. Côte St. Paul, Que., June 28, (Mrs. C. Stevenson).

6141. *Batyle suturalis*, Say. 4 sp., July 27, Aweme, (Criddle).

6179. *Xylotrechus colonus*, Fab. Oct 10 (?), a very late date, Montreal, (E. Denny).

6180. *Xylotrechus sagittatus*, Germ. Ottawa, (Fletcher); St. John, (McIntosh).

6279. *Bellamira scalaris*, Say. St. John, rare, (McIntosh).

6330. *Leptura nigrella*, Say. Montreal, (Stevenson).

6332. *Leptura canadensis*, Fab., var. *erythroptera*, Kby. Kaslo, (Cockle); Vernon, (Venables); St. John, very rare, (McIntosh).

6423. *Leptostylus macula*, Say. Aweme, June, (Criddle).

6437. *Lepturges querci*, Fitch. Montreal, July 1, (Stevenson).

6450. *Hoplosia nubila*, Lec. Bred from Basswood, June, Ottawa, (Fletcher).

6497. *Oberea quadricallosa*, Lec. Sicamous, B.C., Aug., (Fletcher); Vernon, (Venables.)

6533. *Donacia magnifica*, Lec. Rare, St. John, (McIntosh).

6544. *Donacia femoralis*, Kby. Inverness, B.C., July, (Keen).

6972. *Haltica punctipennis* Lec. June 27 to Aug. 10, common, Aweme, (Criddle).

7082. *Odontota nervosa*, Panz. Not common, St. John, (McIntosh).

Cassida viridis, L. Dr. Fyles writes from Quebec. "This beetle has again made its appearance in strength. I noticed it first this year on May 29." In my reference to this species in the Entomological Record for 1902, I stated that comment had been made upon Dr. Fyles's article in the Canadian Entomologist by Rev. Elias Roy. This, I regret to find, was a careless mistake on my part, as it was the editor of "Le Naturaliste Canadien" who wrote the comment referred to in a footnote to Mr. Roy's paper. (J. Fletcher.)

7304. *Cœlus globosus*, Lec. Cordova Bay, B.C., May 31, quite numerous in one spot buried in the sand near to, or partly under, logs on the beach ,(Hanham).

7356. *Eleodes pimelioides*, Mann. Common under logs, Vernon, (Venables).

7584. *Ægialites debilis*, Mann. Fine series of this very rare beetle, with the larvæ and pupæ, have been sent from Metlakatla, by Rev. J. H. Keen.

7680. *Eustrophus bifasciatus*, Say. Côte des Neiges, Que., Apr. 10, (Stevenson).

7729. *Ditylus gracilis*, Lec. Metlakatla, June, (Keen).

7993. *Schizotus cervicalis*, Newm. Côte St. Paul, Que., May 10, (Stevenson).

8346. *Sitones hispidulus*, Germ. Trenton, "very common this autumn, not previously taken," (Evans)-

8540. *Grypidius equiseti*, Fab. Not common, St. John, (McIntosh).

8613. *Magdalis Lecontei*, Horn. On pine tree, Vernon, May 25, (Venables).

HYMENOPTERA.

The record of Hymenoptera for 1903 was to have been prepared by Mr. W. H. Harrington, but exceptionally heavy official work has made this impossible, and that record must be held over.

ORTHOPTERA.

Not much has been done in the way of sending in records of Orthoptera collected during the year, but the following interesting notes from Mr. E. M. Walker, our only Canadian authority on this order, will be read with interest.

"In last year's Record I sent you the name *Nemobius palustris*. This insect was thus determined by Dr. Scudder, but the species is a new one, nearest allied to *palustris*. It has just been described by Prof. Blatchley in his report on the Orthoptera of Indiana as *N. confusus*. I took the true *palustris* for the first time this season in Algonquin Park, where it was found among the sphagnum moss of a floating cranberry bog. You can therefore enter both of these names as Canadian. I also took a pair of long-winged specimens of *Xiphidium saltans*, formerly known only in the short-winged form, in which these organs are very abortive."

One of the most interesting captures made during the past year was that of the large Cockroach *Rhyparobia* (*Panchlora*) *maderæ*, Fab., which was taken by Mr. Bowman, of Messrs. Bowman & Angeime, in one of their warehouses, at St. John, N.B., and was sent forward by Mr. McIntosh. Mr. A. N. Caudell, of Washington, who kindly named the species states that this large cockroach is becoming quite cosmopolitan but has never previously been recorded from the United States or Canada. It is a large species measuring one inch and three-quarters in length, expanding two and one-half inches across the wings, with a body nearly three-quarters of an inch in width at the widest part ; the wings are testaceous, crossed by numerous fine straight lines between the narrow nervures.

Diptera

Culex incidens, Thoms. Massett, Q. C. I., and Metlakatla, B. C., (Keene); Vancouver, common Feb'y., (Harvey).

Culex Fletcheri, Coq. Regina, Calgary, etc., July, our largest common mosquito, very tawny in colour, (Willing).

Aedes Smithii, Coq. Reared from the pitchers of *Sarracenia*, Mer Bleue, near Ottawa (Fletcher, Gibson).

Symphoromyia cinerea, Johnson. North of Pincher Creek, N. W. T., July 30, (Willing). Hitherto reported only from New Hampshire, (D. W. Coquillett).

Stratiomys barbata, Loew. Victoria, B.C., July, (R. C. Osburn).

Stratiomys lativentris, Loew. Rare, St. John, (McIntosh).

Chrysops hilaris, O. S. Male and female. This was the first discovery of the male, St. John, (McIntosh).

Chrysops mitis, O.S. Vernon, Aug. 14, (Venables).

Chrysops frigidus, O.S. Aweme, June 29, (Criddle); Vernon, (Venables).

Chrysops pertinax, Will. Vernon, (Venables). No specimen in the U. S. Nat. Museum: it was described from Washington State, (D.W.C.)

Chrysops delicatus, O.S. Rare, St. John, (McIntosh).

Chrysops fulvaster, O. S. Rare, North of Regina, July 1, (Fletcher, Willing).

Chrysops æstuans, v. d. Wulp. Weyburn, N.W.T., June, (Willing).

Chrysops proclivus, O. S. St. John, (McIntosh). Known hitherto from Pacific Coast only. (D.W.C.)

Silvius gigantulus, Loew. Vernon, (Venables); Vancouver Island, July, August, (Taylor, Harvey).

Silvius actæon, O. S. Several specimens, July, Aug., St. John, (McIntosh).

Tabanus epistatus, O.S. Vernon, Aug., (Venables).

Tabanus cinctus, Fab. Aweme, July, (Criddle).

Tabanus illotus, O.S. Aweme, June 29, (Criddle).

Tabanus rhombicus, O.S. North of Pincher Creek, July 30, (Willing); Aweme, July 6, (Criddle); Vernon, (Venables).

Tabanus insuetus, O.S. Aweme, July 9, (Criddle); McLeod, July, (Willing); Vernon, June 27, (Venables).

Tabanus punctifer, O S. Vernon, (Venables).

Tabanus septentrionalis, Loew. Aweme, July 11, (Criddle); Vernon, Aug. 5, (Venables); St. John, male not previously known, (McIntosh).

Tabanus ægrotus, O.S. Wellington, (Taylor).

Tabanus pruinosus, Hine. 1 sp. July, St. John, (McIntosh).

Scleropogon (Stenopogon) inquinatus. Loew. July 3, Vernon, (Venables).

Cyrtopogon leucozonus, Loew. Male, May 14, Vernon, (Venables). Only females in U. S. Nat. Mus. (D.W.C.)

Pogonosoma dorsata, Say, Goldstream, V. I., July, (Harvey)

Gastrophilus equi, Fab. Vernon, (Venables).

Gastrophilus nasalis, L. Maple Creek, N.W.T., Aug. 2, (Willing).

Eclimus Harrisi, O.S. Rare, St. John, (McIntosh).

Systœchus candididus, Loew. Mount Cheam, B. C., Aug., (Harvey).

Rhyncophelus Sackeni, Will. Vernon, June 22, (Miss Venables). Distribution, Illinois to Brit. Col. (D.W.C.)

Pterodontia misella, O.S. Wellington, (Taylor).

Lasiophthicus pyrastri, L. June, August, Vancouver, (Harvey); Pincher Creek, July 29, (Willing).

Chrysotoxum pubescens, Loew. Rare, St. John, (McIntosh).

Melanostoma Kelloggii, Snow. 1 sp., St. John, (McIntosh).

Criorhina nigra, Will. A few in May, St. John, (McIntosh).

Criorhina Kincaidi, Coq. Vancouver, May, (Harvey); Vernon, (Venables). We have only the type specimen, a male, in U. S. Nat. Mus. (D.W.C.)

Merodon equestris, Fab. St. John, 1902, (McIntosh). First recorded as found in North America by Mr. Chagnon last year.

Volucella facialis, Will. St. John, (McIntosh). Hitherto only known from the Pacific Coast. (D.W.C.)

Eristalis inornatus, Loew. Rather common, June, July, St. John, (McIntosh).

Eristalis flavipes, Walk. North of Olds, Alta., Sept. 12, (Willing).

Xylota barbata, Loew. North Renfrew, B. C., July, (Osburn).

Myopa clausa, Loew. Rare, May, June, July, St. John, (McIntosh).

Myopa plebeia, Will. Hatzic, B. C., April, (Draper).

Gymnochæta alcedo, Loew. Vancouver, May, (Harvey).

Winthemia quadripustulata, Fab. St. John, (McIntosh); bred from larva of *Marumba modesta*, Ottawa, (Fletcher).

Œstrophasia clausa, Br. & Berg. Rare, St. John, (McIntosh).

Alophora fenestrata, Coq. A few in August, St. John, (McIntosh).

Pyrellia cyanicolor, Zett. Vancouver, April, (Harvey). A rare species.

Cuterebra grisea, Coq., n. sp. Fort Simpson, B. C., (Keen).

Hæmatobia serrata, Desv. St. John, (McIntosh); Regina, (Willing); Vancouver Island, abundant, 1903, (Fletcher).

Pyrgota valida, Harris. One pair, St. Catharines, Ont., June 15, (Fletcher).

NOTES ON INJURIOUS INSECTS OF THE ABITIBI REGION.

By Tennyson D. Jarvis, B. S. A., Demonstrator in Biology, Ontario Agricultural College.

Larch Saw-Fly (Nematus Erichsonii).—Nearly all of the trees in this northern country have been destroyed by the larvæ of this Saw-Fly. During the early part of July the adult flies were seen floating down the Porcupine River, and a few days later the shore of Nighthawk Lake was covered with them. Papa-cases were found in masses beneath the surface of vegetation of all the trees examined in the district. The flies deposited their eggs about the first week in July and the eggs hatched about the 12th of July.

Spruce Gall Louse (Chermes abietis).—The Gall Louse was very common on the Black and White Spruces. The Spruces along the water seemed to suffer more than the inland trees, and the White Spruce more than the Black.

Birch Case-Bearer (Coleophora sp.).—This insect was found feeding on the Paper Birch and Alder. In some districts it was very common and destructive to the Birch.

American Tent Caterpillar (Clisiocampa americana).—This pest was found about one hundred miles north of Metagama feeding on the leaves of the Pin Cherry.

Pale Brown Byturus (Byturus unicolor):—This pest was found throughout the district feeding on the leaves and buds of the Wild Raspberry.

Pine Borer (Monohammus confusor):—A few specimens of this Borer were found, and the work of the insect was noticed in a few places.

American Saw-Fly (Cimbex Americana):—The larvæ of this insect were found in considerable numbers on the Willow trees around Nighthawk Lake.

Lace Bugs (Corythuca arcuata):—Common on the Birch and Alder through the region.

Spittle Bugs (Aphrophora sp):—Common on the Red Osier, Dog Wood, Spruces, and many herbs.

Cabbage Butterfly (Pieris rapae):—The larvæ of this insect were found in the Indian gardens around Nighthawk Lake feeding on turnips and cabbage. The adults were found throughout the Region.

Clouded Sulphur (Eurymus philodice):—Adults were quite common around Nighthawk Lake.

Cut Worms (Hadena sp.):—Very injurious in gardens at Fort Mettagami, and common in the Abitibi region,

Alder Blight (Schizoneura tessellata):—Alders were covered with this insect.

Scurfy Bark Louse (Chionaspis sp.);—Found on the Alder at Fort Frederick House Lake.

Ash Colored Blister Beetle (Epicauta cinerea):—Were found feeding on the Wild Vetch near Porcupine Lake.

Black Blister Beetle (Epicauta Pennsylvanica):—Found feeding on Golden Rod.

Butter-cup Oil-Beetle (Meloe angusticollis):—Were found in grass.

Maple Borer (Dicerca divaricata):—The adult of this Borer was found in the middle of July around Nighthawk Lake.

The Banded Purple (Basilarchia arthemis):—This butterfly was found in open places along river banks.

Yellow Swallow Tail (Papilio turnus):—These butterflies were found in the same places as the Banded Purple, and usually accompanied them.

Fall Canker Worm (Alsophila pometaria).—Were found on the Birch Aspen, and many other shrubs throughout the district.

Polyphemus Moth (Telea polyphemus):—These were observed floating on the water, and flying around the river banks.

Locusts :—Were common in dry places, but most of them were in the nymph stage.

Tettix sp. :—Were common in wet places and along river banks.

Pine-Cone Willow-Gall (Cecidomyia strobiloides):—Galls were found on the Heart-leaved Willow.

Birch Aphis (Aphis sp.) :—Aphids in this country were very uncommon, but Birch Aphids were found in small numbers on nearly all Birches.

Potato Beetles (Doryphora decem-lineata) :—A few Potato Beetles were found in the Indian gardens at Fort Mattagami.

Aspen Leaf-Roller :—This insect has caused considerable damage to Aspens in this Region.

Balm of Gilead Leaf-Gall :—This was common on many trees around Frederick House Lake.

HUNTING FOR FOSSIL INSECTS.

By Samuel H. Scudder.

Fully thirty years ago, the last week of July found my companion and myself in a railway town in Wyoming, camping on the floor of the storage-room of a Western post office and "store" combined, frequented alike by Indians, half-breeds and whites. We had just room to lay ourselves down at night on buffalo robes in the narrow passage between barrels of molasses on one side and cheeses and firkins of pretty strong butter on the other, while skins and furs dangled from the rafters overhead. Sometimes cats entered by the one open window and actually fought on our prostrate bodies, awaking us from profound sleep by squalling in our very ears. Green River served us for our toilet.

We were on the search of fossil insects. A few had been obtained in a railway cutting near by and this indicated that more might be found, as proved to be the case. We prospected at various points in the face of the high red buttes which tower above Green River, and where the thin strata may be traced uninterruptedly for many miles ; but at no spot did we discover nearly as many specimens in a given time as at the " Fish Cut," a place across the river two or three miles from the town, where, in making a cutting for the railway many fossil fishes had been exhumed.

To this point, day after day, we went with our satchels, hammers, lunches and canteens, and sat down upon the bank, the walls about us making the July sun still more scorching. There was absolutely no shade, and our only protection was a flat sponge in the crown of our straw hats, parsimoniously wetted now and then from our canteens. The rock here was very hard, and the process of cleaving the shale to disclose the fossils rather trying to the hands, which were well blistered and lacerated after our ten days' work. We obtained a few hundred specimens. Most of them, it is true, were rather imperfect, but fossil insects were a great rarity, and now and then we were cheered by a particularly fine specimen, and renewed our efforts at the precise level at which this occurred. We came to the conclusion that they were mostly found in a small pocket of rock which we exhausted.

Twelve years later, I visited the place again with a different companion. The place was changed, for though there was the same alignment of drinking saloons within quick reach of the station, there was a neat hotel at the station itself, and creature comforts were not lacking. This time we attacked the buttes and especially Pilot Butte on the north side of the railway and were more successful than before. finding many specimens at several horizons, and had the advantage of working a part of the day in the shadow of the butte.

Florissant, in central Colorado, is now the most famous locality for fossil insects in America, and this I have visited at three different times. On the last occasion, having two or three boys with me, we procured a tent, hired a cook, and camped near the little hillock which has furnished the larger part of the specimens, besides having at one end the huge silicified trunk of a Sequoia tree, which some parties had attempted to saw in pieces to carry off ; apparently it proved too severe a task, as the work had been abandoned half finished. Our camp was within pistol shot of this hillock, in a little grove of evergreens overlooking the ancient Florissant lake basin where the fossils were entombed, and so we could give all day to the work. Moreover, as on previous visits I had made a careful study of the spot and noted the levels yielding best results, little had to be done in the way of prospecting. The pick brought out great slabs which, to uncover the fossils, we proceeded carefully to split with knives and geological hammers, seated side by side in the dirt. In this way we obtained many hundred specimens in a day, while some men set at work in some deeper quarries a mile away brought us at the end of our stay what they had exhumed. Each day's pile was carefuly stored in a safe place, and a day at the last given up to packing.

Our cook proved so good in his special line and such a helpful worker with the pick, that we engaged him for the new move the boys were most eager for. Some years before, one of Dr. Hayden's survey parties had discovered in some rocks of about the same age as those at Florissant certain fossil leaves which were identical in species with those found with the insects at Florissant. This was on the summit of the Roan mountains or Book Cliffs, distant some two hundred miles, but still in Colorado. From that point, moreover, it was but thirty miles in a direct line across the mountains to a place where fossil insects themselves had been found in the valley of the White River, though nobody had been able to rediscover the precise locality, and the original explorer was dead. That it was beyond the settled country only excited the enthusiasm of my companions, and so our pecking party around the Florissant hillock spent much time in planning the expedition we finally undertook.

This was in 1889. We made our way to Grand Junction by rail and there procured a simple "outfit" in the shape of a two-horse team, an extra horse and saddles. Our cook was our teamster, and loaded with provisions we pushed out from Grand Junction late in the afternoon of July 12th and camped by the roadside twelve miles on, passing Fruita on the way. By noon of the next day our road left Grand River and headed for the mountains and we reached the last ranch in Salt Creek by nightfall. The close of another day, in which we passed a band of Utes, found us camped in the woods on the summit of the Roan mountains by Cliff Springs, a meagre enough trickling affair, but the only water for miles about.

Here we spent a week, discovered with little doubt the spot where the fossil leaves had been found, but with them no insects. At several other points however, and especially at one place about five miles from camp, we found an exceedingly rich deposit of insects, very easily worked. This locality was a charming one. At the height of nearly nine thousand feet and at the very brink of a precipitous descent of more than two thousand feet, one looked beyond the deeply cut ravines to the distant plains, through which the Grand River forces its way. We had to work on the slope of the precipice, cutting footholds for our security from slipping. We had also to walk back to camp, using our beasts as pack animals and following the Indian trail along the brink of the precipitous cliff ; at times this passed through a dense chapparal, where it was difficult to get through without unlading, or injury to our treasures ; at others it ran a little below the brink of the precipice along the talus by a scarcely marked path, where the rubbish loosened by our tread rolled and fell, many hundred feet below. Once, in the most critical spot, a violent storm of hail struck us and whirling about with no regard whatever to our shelving footing, the animals all turned tail to the wind like weathercocks, facing down hill, and nearly set us rolling down the steep embankment ; nor would they budge till all was over.

We were shortly visited at our camp by some of the Utes, including the Indian Police, suspicious of hammers and picks in such close vicinity of the Indian reservation, still more suspicious when they learned our intention to enter it. But they were probably appeased on sight of the fossils, for they did not visit us on the Reservation, though we told them just where we were bound.

After a week's stay, living largely on venison and nightly visited by skunks and other prowlers, including one bear, we cached our fossils, and made our next move of forty miles to the White River by way of Douglas Creek. We had for company a team of road-makers, who had been camped near us There was one ranch and a well of water at a point about midway, where we camped the first night. For myself, armed with hammer and insect net, I walked alone the rest of the journey, meeting not a soul, and shall never forget that broiling, breathless valley. I found just one bit of shade the entire distance by hugging a huge rock, and here I stripped to the skin to bathe in the air, the only element at hand, and then pushed on, inspired by the thought of a coming plunge in the White River.

At Rangeley, where we struck the river, were, within a radius of a couple of miles, four or five ranches, a school house and a postoffice, visited twice a week by a post rider from the nearest station, sixty miles away. Here we rested a couple of days, restocked our larder, and then pushed down the river to the Utah boundary and Reservation. The road, if road it could be called, where no teams passed, was of the roughest, and we all had literally to put our shoulders to the wheel to get past difficult places, or to prevent an upset. At the end of two days' journey we found by the river bank a winter camp of herdsmen, now deserted, and took possession, though we slept in the open.

Here, in the course of a fortnight or more, we explored the region for ten miles around, varied by an occasional irruption of cow boys in search of vagrant cattle, and willing to play a trick or two on "tenderfeet." We were more than a dozen miles beyond the last ranch and had the world to ourselves. We bathed in the coffee-colored White River morning and evening, but the day was given up to exploration and quarrying in the hot August sun. The superb frowning cliffs enticed us in every direction, and we found fossil insects at a dozen different points, and at many horizons of the varicolored strata. We pushed our way into most of the burning side canons but, as it was hot enough elsewhere, merely looked into "Hell Hole." Our most successful quarrying was on the very top of one of the highest bluffs, fully a thousand feet in height, up which we had not only to climb by a precipitous talus heap, but drag a horse after us, laden with our lunch and a keg of water. The water was turbid enough, and our only lunch cold oatmeal and sugar, the cooked oatmeal of a muddy color from the impurity of the water. All specimens had to be wrapped and carefully packed in satchels for the descent. But we succeeded in our search, found large slabs quite covered with insect remains, and brought away many hundreds of fossils, and finally a large experience of roughing it in the West.

Our horses barely dragged our laden wagons back to Grand Junction, one of the party, taken down by illness during our halt on Roan Mountain, having to lie at full length all the way over the rough roads in the springless wagon. As a result of this six weeks' trip we discovered that fossil insects can be found at two additional places in Colorado, as abundantly as at Florissant. No doubt there are many other places awaiting discovery.

RECOLLECTIONS OF THE PAST.

By J. Alston Moffat, London, Ont.

It has been remarked that it is a certain indication of persons getting old when they become reminiscent. The recent death of Mr. James Angus, of West Farms, near New York, who was for thirty-two years a member of the Entomological Society of Ontario, turned my thoughts backwards upon many things, and as there is no question now as to my being old, it will be quite in harmony with my condition to indulge a little in what is regarded at that time of life as an excusable natural propensity.

My acquaintance with Mr. Angus was brought about through a somewhat peculiar chain of incidents that will require relating.

Living in Hamilton at the time, and having turned my attention to the collecting of insects as a recreation in ill-health, having all my life been afflicted with a feeble digestion, I found it necessary to avoid business in order to secure some prospect of recovery. And as idleness was misery to me, I found collecting insects such a congenial occupation that it soon claimed my whole attention. Having discovered that cider was to me an aid to digestion, I one day came upon a person who was disposing of cider in small quantities, and made arrangements with him to supply me regularly. After we became acquainted he informed me that his name was George Anderson—that he lived for some time in the neighborhood of Providence, Rhode Island, and had been gardener for a man of means there, who at the outbreak of the Civil War had to close up his establishment in order to curtail expenses. So Mr. Anderson had moved to Canada, purchased land on the opposite side of the Bay from Hamilton, part of an estate called "Oaklands," and was then engaged in market gardening on his own account. He also informed me that he was well acquainted with a family in Providence of my name, and was wondering if we might not be related. I told him that I was too young when brought to this country to know much about my relatives there; but I had heard that some of my father's folks had moved to this side of the Atlantic, but where they were located I did not know. Nevertheless, if there was any connection between us, there would be no difficulty whatever in tracing it; as my father had a brother in Glasgow who was well known, Dr. William Moffat, who had served as a surgeon under Wellington during the peninsular war, and had attained some fame. Mr. Anderson laughingly remarked that he had often heard them speak of "their uncle the Doctor," as Mrs. Anderson came from Glasgow and knew the Doctor, consequently he was a frequent subject of conversation between them. Dr. Moffat had become a Baptist, and attended the same church as Mrs. Anderson and her people went to and was in the habit of regularly addressing their church meetings. Thus a friendship was established between Mr. Anderson and me. He invited me to visit his place and make the acquaintance of Mrs. Anderson, which I gladly accepted, it being just a pleasant walk round the head of the Bay from Hamilton, during which I could do a little collecting by the way. Then, when Mr. Anderson learned that I was engaged in collecting insects, he informed me that he had a brother-in-law in New York, who was a collector and had an extensive collection, James Angus by name, a brother to Mrs. Anderson, and thus I first learned of Mr. Angus. It was not long before Mr. Angus heard of me through Mrs. Anderson, he having a great admiration of Dr. Moffat in religious matters. And here I may introduce an incident of quite recent occurrence.

Whilst looking over the list of members of the Philosophical Society of Glasgow for the year 1901, my eye rested on "J. Carfrae Alston." Thinking it was likely that I had many relatives of that name in Glasgow, I became curious to know if he might not be one of them, and as his address was given I thought I would make bold to enquire. So I wrote to him, stating how I had come by his name and address, and that my curiosity had been excited to know if we were connected, and he being a member of a similar society an interchange of thought might not be objectionable, and if there was any connection it could be easily determined, as my mother was a sister of the late John Alston, of Rosemount, more generally known as Bailie Alston, who took a deep and active interest in the Royal Glasgow Asylum for the Blind, and had the Bible printed in raised letters for their use so that all could read. A marble bust of him stands in the main entrance of the institution as its most eminent benefactor, with other means of identification.

In due time I received an acknowledgement from C. S. Alston, stating: "Your note of 21st January last, addressed to Mr. J. Carfrae Alston, has been handed to me for perusal and reply, as Mr. Carfrae Alston is quite unaware of the Moffat connection. Mr. J. Carfrae Alston is a son of the late Thomas Alston, the second son of the late Bailie John Alston, of Rosemount, who died some fifty or sixty years ago. He is a very busy man, who takes a deep and lively interest in the philanthropic work of our great city, and is held in much estimation by his fellow citizens.

"I have a faint recollection of your people, who were in business on the High Street of Glasgow. Also of your uncle, Dr. William Moffat, whose surgery was on the same street, and who I was told had held the post of Surgeon-Major in the Army under the Duke of Wellington, was taken prisoner by the French, but afterwards made his escape from a prison in Paris by getting into and passing through a common sewer into the River Seine and reaching the hands of his friends after many difficulties." Mr. C. S. Alston further adds: "I may state that I am the son of a half-brother of Bailie Alston, and lately retired from the Governorship of Glasgow Prison, after a service of forty-four years between the County of Lanark and the Government."

This Bailie Alston must have been a man of taste, with a strong inclination towards natural history subjects, as well as being of a philanthropic turn of mind. Every time I visited Rosemount with my mother or my eldest sister, I seem to have received a fresh impression of something that I saw there that has endured to the present. An extensive garden, planned to show to the best advantage the gardener's art; much shrubbery and many winding paths, in turning which you obtained a different view of the brightly colored flowers in the many beds of various forms. A greenhouse against the side of the kitchen; and behind the receding shelves upon which the flower-pots stood was an aviary, in which was a diversity of native singing-birds, bright and lively—a source of unfailing wonder and delight to me. A high stone wall enclosed the premises, as was the fashion of the times, with ornamental gates in front. In the wall at the back of the garden was a door, which was used as a short cut in that direction. Over the pathway leading to this door a whale's jaw had been set into the ground, and formed an arch under which one had to pass when going out of that door; and I remember the awe with which I surveyed that arch, and wondered at the hugeness of the animal that had owned it.

But that which has retained its interest for me through all these years was an experience which the Bailie was engaged in carrying out with a living toad. He had no doubt read, as probably all of us have done many times since, of toads having been found alive in solid rocks, living trees or great depths of soil; where, if we are to believe the tales, they must have remained in a dormant condition for long periods of time, some of them counted by centuries, without light or food. And he seemed to have undertaken the task of proving to some extent, the powers of endurance possessed by a toad for a long period of successful hybernation; so as to test to that extent the reliability or otherwise of these newspaper stories, exhibiting a decidedly practical turn of mind, combined with true scientific exactness. What appeared to be a full grown toad had been procured, placed in a flower pot half filled with soil. The pot covered with a piece of slate, then all buried a good depth in the ground, to be taken up and examined once a year, and repeated for ten years if the toad survived.

I was fortunately, but quite accidentally, present at the third annual opening and exposure of that toad to view—a boy of eight or nine years at the time. A company of interested persons had been invited to be present on the occasion. A wide circle was formed round the locality, which was in a well kept lawn. The gardener, who knew the spot, unearthed the pot, lifted it out, took off the slate and exposed the toad. It was in but not under the soil, appeared to be sound asleep and shewed no indication of wasting from want of food. After a little while of exposure it gave signs of life, straightened its front legs, opened its eyes, and seemed to be getting ready to make a jump, when the slate was put on and pot and toad buried for another year.

I have always had a desire to know what was the result of that experiment, as a mystery of great interest surrounds the hybernation of animals, that can be satisfactorily cleared up only by such a method of investigation. And I had great hopes of obtaining some further information about it from Mr. C. S. Alston, and referred to it in one of my letters to him; but all he said in reference was, "I have often heard my father speak of the toad in the hole." And now that he is gone, possibly all knowledge of the transaction is forgotten.

Some animals seem to be capable of entering into a comatose condition at pleasure; others, only when constrained by external conditions. Hybernation may be either partial or complete. In the case of the mammalia hybernation is only partial, as respiration and circulation are not wholly suspended; the creature coming out of that state in a greatly reduced and exhausted condition, proving that a prolonged period of time in that state beyond what is usual to it, would certainly end fatally with it. In the reptilia the case is different. When they go into hybernation it is complete, respiration and circulation being totally suspended, and therefore there is no wasting of their substance, giving good reason for the belief, that under suitable conditions, they might remain in that state indefinitely and come out alive, with sufficient vigor to enable them to fulfil the functions of their life as if nothing unusual had occurred to them, thus lending support to the wonderful stories that have been put in circulation about them; and that there may be after all some truth in them.

In entomology, the internal and external influences at work in producing hybernation, partial or complete, are about as various as the life histories of the species indulging in it. And very little careful investigation has been made to discover the powers of endurance that may be possessed by any of them to resist a prolonged period of suspended animation without injury. Accidental observations have been made which prove that some species are capable of enduring a period of hybernation far beyond what is usual with them, and come out of it with their powers unimpaired by it. Herein we have an important matter for scientific investigation. In view of the fluctuation of temperature on the earth's surface since life appeared upon it, the advantages to any species possessed by such powers, must indeed have been very great. It would enable it to go into a state which would in a measure make it oblivious to the adverse conditions surrounding it, which otherwise would have exterminated its species, thus placing it in a position when circumstances were again favorable for propagating its kind, to continue its career and thus affect in a marked degree its distribution on the face of the globe.

When I got into communication with Mr. Angus at first, he was engaged in making a collection of *Catocala*, of which he ultimately secured, by purchase or exchange, one of the largest and most complete collections of his time. His ambition being to have every known species and variety represented in it. Hamilton was particularly rich in this attractive genus, and the late Mr. William Murray turned his attention almost exclusively to it for a time, and supplied Mr. Angus with many specimens that he was then in want of. Mr. Angus, having become an expert in the nomenclature of the genus, rendered us much service in naming our specimens.

There were to be found in the neighborhood of Hamilton about twenty species that might be fairly pronounced abundant, and some of these had their varieties in goodly numbers associated with them. Then there were eight species that were considered as rare. Our favorite and most productive hunting ground for *Catocala* was what has been more recently known as the Asylum Woods. Only at that time the Asylum had not come into existence, so it was designated after its nearest resident neighbor. It was an extensive bit of virgin forest, composed of large oaks, hickory, beech and maple, with very little under-brush, an ideal daylight hunting ground. Having discovered that perfect specimens of *Catocala* were not to be secured by the use of a net, they being so strong of wing and loose in scale, one flutter in the net would leave the thorax naked and ruin the specimen ; so we would examine the tree and discover, if possible, the moth asleep on its bark, place a poison bottle over it, slip a card between the bottle and the tree, and a few flutters on the smooth glass did it but little injury. But most of them preferred resting upon oak trees, whose bark they resembled so closely that it was impossible to detect all of them. So a switch was rubbed on the tree to start those overlooked, and they were followed up to the next tree they would alight upon. Then a process of "Stalking" had to be indulged in, as each time they were disturbed they became more wary. This method of collecting in day-light affords an opportunity for studying their habits not obtainable at sugar or light. Their general mode of flight is a rapid, jerking, zig-zag movement, with various degrees of intensity in the different species, which makes it difficult to follow them with the eye. Some kinds, when disturbed, would alight upon the nearest tree plainly in sight, whilst others would disappear in the distance, and others again would vanish behind the nearest tree. Some would alight higher up every time they were disturbed, soon putting them out of reach, whilst *Obscura* would alight at the root of a tree or even on the ground. *Catocala* mostly rest with their heads up, but there are species which rest with it down. I have seen them alight head up, then prepare themselves for another rest by turning head downward. *Amica* would often move a few inches to one side on the same tree, and I have thus followed them until they had encircled the tree. *Catocala* are extremely sensitive to changes in the weather. On a fine warm day, they may be in profusion ; on the next, in the same locality, with an east wind, there will not be a specimen observable. What became of them or where they hid themselves, I could never learn. One very warm afternoon, I saw *Palæogama* flying about the woods and apparently pursuing one another in a sportive mood like butterflies. They might have been taken with a net by the dozen.

The species that were most plentiful and that could be depended upon to appear more or less numerously every season were: *Retecta*, *Obscura*, *Relicta* with its variety *Bianca*, *Amatrix*, *Concumbens*, *Unijuga*, *Briseis* with its variety *Semirelicta*, *Meskei*, *Parta*, *Ultronia*, *Ilia* and its variety *Uxor*, *Innubens* and its variety *Scintillans*, *Cerogama*, *Neogama*, *Subnata*, *Piatrix*, *Palæogama* and its variety *Phalanga*, *Habilis*, *Polygama* and *Amica*, with *Parthenos Nubilis*. The rarer species, that is, such as we never got all that we want of them, indeed some of them taken only in single specimens of their kind were : *Epione*, *Desperata*, *Insolabilis*, *Levettei*, *Cara*, *Coccinata*, *Serena*, *Clintonii*. All of these, with the exception of *Meskei* which was extremely local in its habits, I have taken in the vicinity of Hamilton. I also took a single specimen of *Elonympha* at Ridgeway, the only one as yet reported to my knowledge that has been taken in Canada. Mr. James Johnston has recently added *Robinsonii* and *Nebulosa* to the Hamilton list.

Mr. Angus never associated himself with any of the New York Entomological Societies, and the reason which he gave to me for it was that they usually held their meetings on Sundays which he did not approve of, he having received in his youth a strict Scottish education on this subject, which gave him a strong regard for the sacredness of the day So his extensive information upon entomological subjects seldom got beyond his own private circle, which might have been different if he had been more congenially situated. Mr. Grote speaks of him in the Annual Report of the Entomological Society of Ontario for the year 1888, page 62 As one of those that were attracted to him for information upon Entomology, at a time when Mr. Grote was the leading authority on North American Noctuidæ, and he must have been impressed with the appearance of the man, as he remarks upon him as a tall Scotchman with curious, white and black in bunches, parti-colored hair, very intelligent, kindly but reserved. By the time I met him, his hair had become all white, his reserve was not conspicuous, but his kindly intelligence was very noticeable. He visited Mr. and Mrs. Anderson at their Oakland residence while I was living in Hamilton; so I had the pleasure of meeting him upon several occasions and found him to be a very pleasant and profitable guide upon a collecting excursion. He was in the habit of observing every branch of Entomology and had a general knowledge of its various departments. He called my attention to two species of Ladybirds which were rare with him and which I had not observed before, *Coccinella transverso-guttata*, Fab., and *monticola*, Muls. They were at the time in great numbers upon Mr. Anderson's strawberry beds, but I have never seen them in any numbers since. It seems to be a habit with ladybirds for one species to appear in profusion during one season, to the almost complete exclusion of all the others. Then another species will be equally plentiful another season, but never the same species in unusual numbers for two years in succession, which seems to be rather odd and requires some explanation. I have seen this occur with species that are by no means rare, such as *trifasciata*, *bipunctata*, *pallata* and *15-punctata*. On one occasion, when I was visiting in the country for a few days, where they were drawing in peas, I saw the barn floor covered half an-inch deep with a living mass of *H. parenthesis*, and hardly another species was to be found amongst them. I have observed another curious habit of some species, in their larvæ gathering together in clusters on the trunks of trees to pupate. I have come upon many such clusters in different years, and they were mostly on Basswood trees.

During the time of that visit by Mr. Angus, Thistle butterflies were unusually plentiful about Hamilton, and he took great pleasure in looking at them as they swarmed over the clover fields, and expressed the opinion that he had never before seen that butterfly so large in size and rosy in color. It was about the time that he made over his Entomological Collection to the New York Museum, and as a natural result, began to feel less interest in Entomology, so to occupy his time he commenced collecting Indian relics, which he thought would be more suitable for him at his time of life.

REV. GEORGE WILLIAM TAYLOR, F.R.S.C, F.E.S., F.Z.S.

The readers of our Report and of *The Canadian Entomologist* will be pleased, we feel sure, to see the good portrait given herewith of the Rev. G. W. Taylor, who during the last twenty years has done such excellent work in almost all lines of natural history in British Columbia. Born in 1854, in Derby, England, where he received his education, Mr. Taylor, after leaving school, studied mining engineering, but in 1882 came out to Canada and went direct to British Columbia, where he had relatives. Although engaged for a short time in farming, he began almost immediately to study for the ministry and in 1884 was ordained by the Bishop of Columbia. Since that time, with the exception of two years, from September, 1888, to August, 1890, which he spent in Ottawa as Rector of the joint parishes of St. Barnabas and Holy Trinity, he has been in charge of parishes in British Columbia, and at the present time is Rector of the Anglican Church at Wellington, B. C. From boyhood Mr Taylor has been keenly interested in natural science and has from his enthusiasm and industry accomplished much, not only in doing original work of importance in several lines of zoology and palæontology, but in constantly encouraging and assisting others with whom he came in contact to take up and enjoy with him his favorite studies. Mr. Taylor has for many years been a Fellow of the Entomological and Zoological Societies of London, England, and in 1884 was elected a Fellow of the Royal Society of Canada in recognition of his eminent services to science, particularly in connection with his investigations in Canadian Conchology and Entomology. In 1887, Mr. Taylor was appointed Honorary Provincial Entomologist of the British Columbia Department of Agriculture and sent out a circular letter to farmers drawing their attention to the losses due to insects and asking their co-operation. Owing to his removal to Eastern Canada in 1888, this work was relinquished before any report was issued. Several important papers have appeared from his pen in the Transactions of the Royal Society of Canada, *The Canadian Entomologist*, *The Ottawa Naturalist* and *The Nautilus*. Many new species have been discovered by this energetic worker, and several have been named after him. Among insects, species which have been mentioned in *The Canadian Entomologist* are *Melitæa Taylori*, W. H. Edwards; *Anthelia Taylorata*, Hulst; *Ichneumon Taylori*, Harrington; *Trichiosoma Taylori*, Provancher; and *Adranes Taylori*, Wickham All orders of insects, however, have been studied, and several other species in different orders from those named, have been or are being named after the subject of our sketch. Some of Mr. Taylor's best work has been done on the Mollusca, and naturally several new species have been described after him. Names which occur to us are *Pristoloma Taylori*, Pilsbury; *Modiolaria Taylori*, Dall; and *Phyllaphysia Taylori*, Dall. In addition, a new species of sponge, *Leucandra Taylori*, Lambe, may be mentioned.

Enormous and valuable collections of British Columbian specimens of various kinds have been made and generously sent off to collectors in all parts of the world. Mr. Taylor possesses himself the largest private collection of Limpets (Patellidæ and allied families) in the world, also the most complete collection of Unioidæ in Canada, and one of the largest general collections of land and water shells (7,000 species) in Canada

A constant collector of insects, Mr. Taylor has also amassed valuable collections of insects in several orders, notwithstanding the fact that he has made a practice continually of giving away to specialists any specimens from his own collection, which were required for study. His cabinets contain a wealth of representative specimens of inestimable value to the many beginners who have been stirred up by his enthusiasm to investigate the insect fauna of our Pacific Coast Province. At the present time he is devoting all his energies to the working up of the North American Geometridæ, paying particular attention to northern species which are likely to occur in Canada. Since the death of the Rev. Geo. D. Hulst, this important family of moths had been somewhat neglected by American students. Mr. Taylor's methods of work are systematic and thorough. First reviewing all the literature of the subject under consideration, he then strives to acquire types for study from the original localities, compares these with the descriptions and then with extensive series of specimens from as wide an area as possible. Mr. Taylor is an indefatigable collector and a generous correspondent, who considers no trouble too much to make observations or secure specimens when specially desired. In his parish work he is painstaking, gentle and self-denying—always ready to help. A clear and forcible preacher and an earnest liver who shows in his works that religion is not an accessory of every day life but an integral part of it. J. F.

PROFESSOR AUGUSTUS RADCLIFFE GROTE.

It is with profound regret that we record the death of our greatly esteemed friend, Professor Augustus Radcliffe Grote, A.M., which took place at Hildesheim, Germany, on Saturday, September 12th, where he had been living for the last nine years, after a residence at Bremen of a somewhat longer period. Not long before his departure from the United States for Germany he sent to Dr. William Saunders, at that time editor of the "*Canadian Entomologist*," some particulars of his early life, which will, no doubt, be of much interest now.

He was born at Aigburth, a suburb of Liverpool, England, on the 7th of February, 1841. On his mother's side his grandfather was the late Augustus Radcliffe, a partner in the house of Sir Joseph Bailey, a Welsh iron-master; his mother was a cousin of Mrs. G. M. Boswell, wife of the well-known Judge Boswell, of Cobourg, Ontario, and of the Radcliffes, who formerly lived in this Province, and in the Isle of Wight, England; he was a first cousin also of Ethel Duncan, the wife of the late Professor George Romanes, F.R.S.

On his father's side the family traced their descent to Hugo Grotius, the Dutch writer and author of *De Veritate Religionis Christianae*, a theological text book familiar to students a generation ago. His father, who was born at Dantzic, in Prussia, where his half-brother was Director of the Royal Academy, and a painter and etcher of eminence, was an only child by the second marriage of his mother; she was the daughter of a Lutheran clergyman, who at the time was the highest ecclesiastical dignitary in Dantzig. The family name was originally written "Grohte," and was changed to "Grote" by Act of Parliament, when the Professor's father became an English citizen. At the early age of seven our friend came to New York, following his parents, who had made the voyage the year before, and had now decided upon taking up their abode in the United States. His youth was passed on Staten Island, where his father had bought a large farm, and becoming interested in real estate conceived the idea of the Staten Island Railway, of which company he was the secretary and treasurer during the period of its construction. The commercial panic of 1857, and the resulting depression of business threw the enterprise into Mr. Vanderbilt's hands, and Mr. Grote's real estate investments turned out disastrously. Meanwhile young Grote had been preparing for Harvard University, but was obliged by the straitened circumstances of the family to abandon his prospective career; later on he was enabled to go to Europe and completed his education on the Continent; after his return he received the degree of A.M. from Lafayette College, Pennsylvania.

From his earliest years Prof. Grote was a student of nature, and his delight as a boy was to roam through the woods and over the upland meadows of Staten Island. In his "Hawk Moths of North America" he describes the joys of these rambles; "the early dawn," he writes, "is a profitable time for the collector of lepidoptera, who may then surprise the moths on their first resting places after the fatigues of the night. On Staten Island my early rising was rewarded by many captures at the hour when the cat bird sings and betrays to none but chosen ears her relationship to the many-tuned mocking bird of the south." Again, "collecting at night has the drawback that one never knows when to stop and go home to bed, seduced by the mysterious silence and shadowy vistas in the woods. Even when the moths will no longer come to bait, one lingers, waiting for some revelation. The moon has transformed the prospect, and in its weird light an uneasy spirit seizes one to adventure farther yet. . . . Thus certain hours and places, lanes along which the green tiger beetle flew up ever and anon before my boyish feet, marshalling the way that I should go, come back to me again out of the years of my early studies, intoxicating my memory. Poe says that joy is not gathered twice in a life, as the roses of Paestum twice in a year. But I gathered then so much that it lasts until now, when world-griefs hold me fast."

At the age of twenty-one Prof. Grote published his first papers on new species of Noctuidae in the Proceedings of the Academy of Natural Sciences and of the American Entomological Society of Philadelphia, and soon after he corrected the proofs of his friend, Dr. A. S. Packard's paper on United States Bombycidae, while the author was absent at the seat of war in the South. From 1862 his contributions to Entomological literature succeeded each other rapidly, and by the time he left America for Germany he had described a very large number of genera and species, and was justly regarded as our chief authority on the nocturnal Lepidoptera of North America.

In 1880 Prof. Grote married a grand-daughter of Judge Johnson, of Charleston, S.C.; she died in Alabama on the birth of his second child after three years of happy married life. It was fully ten years later when, in Germany, he was married a second time to Fraulein Minna Ruyter, who, with several children, now survives him.

During his residence in Alabama, Prof. Grote studied the cotton worm, and brought the subject before the public in a lecture; he then went to Washington and tried to interest the

Government in the matter, but without success. Subsequently "The Entomological Commission," consisting of Messrs. Riley, Packard and Thomas, was appointed by Act of Congress, and Prof. Grote was keenly disappointed at his failure to obtain a place upon it; this failure he, rightly or wrongly, attributed to the adverse influence of Dr. Riley, and for many years he took every opportunity of criticizing in vehement language the work of this distinguished Entomologist. He was, however, employed by the Commission in 1878 to visit Florida, Georgia and Southern Alabama for the purpose of investigating the insects injurious to the cotton plant, and especially to make observations upon the supposed migrations of the moth. His brief report is incorporated in the large volume published by the Commission in 1885.

Early in 1873, in consequence of the loss of his wife, he left Alabama, and removed to Buffalo, N.Y., where he became curator of the Buffalo Society of Natural Sciences, and began the publication of its Bulletins, to which he contributed the larger proportion of the articles. In 1878 his reputation as an Entomologist had become so assured that he was elected Vice-President of section B of the American Association for the Advancement of Science, and delivered his address at St. Louis on the subject of "Scientific Education." In 1879 he began the publication of a monthly magazine, "*The North American Entomologist*," but the venture did not prove successful, and was abandoned after the issue of a single volume. During his residence in Buffalo he delivered a number of lectures on various subjects, many of which were published in the *Scientific American* and the *Popular Science Monthly*; he also wrote many essays and a philosophical book, "The New Infidelity," subsequently translated into German, which (to quote his own words) "met with warm praise and severe criticism, but enjoyed only a small sale." In 1882 he had published in London, England, a volume of poems collected from various periodicals to which he had contributed them; the principal poem dealt with the ghost theory in evolution, and was favorably reviewed by Mr. Herbert Spencer. The versatility of his talents was further shown by his devotion to music; while in Buffalo he was organist of one of the principal Episcopal Churches, and subsequently composed many pieces of music, one of which only was published, and even attempted the composition of two operas, which, however, he found too great a task and never completed.

Owing to the death of his father he left Buffalo and returned to his old home on Staten Island. There he remained for a few years only and then left for Europe, where he spent the remainder of his days. His large collections of North American Lepidoptera were sold to the British Museum, where his failure to obtain a position on the staff caused him keen disappointment. For ten or eleven years he lived at Bremen in Germany and then removed to Hildesheim, where he spent the last nine years of his life in the congenial position of honorary assistant in the Roemer Museum. During all these years abroad he was by no means idle, but continued to contribute to several periodicals in North America including the "Canadian Entomologist," and to publish numerous essays both in English and German of a high scientific value, and many of them dealing with abtruse philosophical questions.

We may now turn to his connection with our own Society. As long ago as 1868, he was elected an Honorary Member in company with such distinguished Entomologists as Drs. Leconte, Horn and Packard, Messrs. Scudder, Riley, Edwards, Cresson and Glover. Our association of him with these eminent men is a sufficient proof of the estimation in which we held his scientific attainments at that time. His contributions to the *Canadian Entomologist* began with its second volume in 1869 and continued with little intermission down to the present time; in fact the editor has still in his hands several papers sent in by Mr. Grote during the last few months. These articles must number several hundreds, and they were supplemented by some longer, very interesting papers published in these Annual Reports. An excellent likeness of him appeared in the issue of the *Canadian Entomologist* for January, 1895, and in the 25th Annual Report for 1894.

Prof. Grote paid two visits to London in 1876 when he went over the Society's entire collection of Lepidoptera in order that the specimens might be accurately named before transmission to the Centennial Exhibition in Philadelphia, which was held that year. He also, when living in Buffalo, assisted many of our members in the determination of their moths and spared no pains in this laborious work, considering himself well repaid by the occasional discovery of a new species

The name of Prof. Grote will long be held in honor by those who knew him personally or through correspondence; it will also go down to posterity attached to the specific and generic names of many hundred moths of which he was the original describer. In common with all other human beings he had his weak points and thereby incurred the animosity of some against whom he would vent his wrath in no measured terms; but to most he was kindly and genial, always ready to help where he could, and to his intimate friends warmly affectionate even after long years of separation.

We may fitly close this sketch with the following quotation from one of his own essays: "Even in comparatively so small a social field as Entomology affords, the man of science may oppose the purely selfish action, the insincere statement, and try to correct the limited experience which prompts so many faults. From the contemplation of much that is paltry and much that is stupid in the writings and doings of Entomologists, he can at least always turn for relief to Nature herself, standing high above all the schools which strive but to translate her. He may drink in all the loveliness of the world and refresh his soul by wanderings in field and forest, by expansive lake and winding stream. And, when the summer is past and the roses, by thousand ways and voices Nature will still amuse him, until tired of the quest, he falls into the last sleep in the arms of the universal mother."

C. J. S. Bethune.

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ANNUAL REPORT

OF THE

Bee-Keepers' Association

OF THE

Province of Ontario

1903

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Legislative grant	500 00
Fees from affiliated societies	55 00
Use of stenographer's report	12 00
	$758 43
Balance due treasurer	33 59
	$792 02

EXPENDITURES.

Grants to societies and fairs	$265 00
Officers' salaries	75 00
Expenses of convention	3 00
Directors' fees and expenses	199 72
Postage and stationery	25 90
Printing and advertising	15 00
Periodicals for members	114 50
Cost of reporting	50 00
Expenses of executive and revising committee	39 90
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Examined and found correct, December 2nd, 1903.

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Ontario Bee-Keepers' Association.

ANNUAL METTING.

The Ontario Beekeepers' Association held its twenty-fourth annual meeting in the Town Hall, Trenton, on December 1st, 2nd, and 3rd, 1903.

The Secretary read the minutes of the twenty-third annual meeting, held at Barrie, which, on motion of Mr. Dickenson, seconded by Mr. Gemmell, were confirmed, and signed by the President.

PRESIDENT'S ADDRESS.

By A. W. Chrysler, Chatham.

I am very much pleased to greet so many of our old and new members that have assembled here this afternoon. It might be well to remind ourselves that we are one year older than when we last met. "Time rolls its ceaseless course." The remembrances of past years picture varying degrees in the beekeepers' enthusiasm. While we have had in times past good crops and fair prices, there have been others when large quantities of honey never reached a profitable market. While some parts of the Province have not been fortunate in obtaining a good crop this season, there is a surplus in others that is causing some anxiety on the part of the holders.

The same old subjects that we have been discussing in our past meetings are, no doubt, instructive to all of us in obtaining perfection in our pursuit, but I hope you will not allow them to become the all-absorbing subjects for debate. Let us not lose sight of the most vital subject at present conducive to the greatest success and profitableness of our industry, which is the marketing and disposing of our honey in our own and distant markets.

The Honey Exchange Committee will present the report of their work during the past year, enumerating their difficulties and recommendations, and I sincerely hope you, one and all, will give your undivided interest and so express your views that something will result that will be the means of perfecting the plans already begun for the handling of all the honey that we as beekeepers can produce.

When such a condition presents itself, there will be an expansion in the production and exportation that will be as startling as has been in many of our other agricultural products. Let us also profit, if it is at all possible, by our foreign exhibitions of honey held in so many parts of the civilized world during the past few years. In all such exhibitions Canadian honey has taken no second place. It is, therefore, our just claim that Canada produces honey second to none in the whole wide world.

The Executive Committee have made arrangements to collect an excellent exhibit of honey from our members to be displayed conjointly with that of our Dominion Governent exhibit of honey at St. Louis in 1904.

According to the Ontario Government statistics we have in Ontario this year 207,936 colonies of bees, being an increase over 1902 of about 5.4000 colonies.

The Inspector of Apiaries has, so far as I have been able to learn, attended to every call made for his services.

The applications I have received for the Inspector's services, I am sorry to say, have all been too late in the season for him to map out his work to have it performed in the least time and at the least expense.

Although foul brood is fast disappearing, I would urge every beekeeper to give his best efforts to rid the Province of this pest, and also to observe the law on the subject, especially that of section 10 of the Foul Brood Act, which says: "Every beekeeper or other person who is aware of the existence of foul brood, either in his own apiary or elsewhere, shall immediately notify the President of the Ontario Beekeepers' Association of the existence of such disease, and in default of so doing shall on summary conviction before a Justice of the Peace be liable to a fine of five dollars and costs."

I think by a strict observance of the above that foul brood in the Province will very soon be a thing of the past. I hope you one and all will assist to make this one of the most interesting, pleasant, and profitable of meetings.

As many have come to this meeting from a distance, and at no small expense, it is very important that we employ our every moment in useful and profitable discussion. As your President, I shall endeavor to judge without partiality upon every subject submitted for consideration, and trust that I may confidently rely on the members in supporting the dignity of the chair and maintaining the decorum and orderly demeanor of our meeting.

THE ADVANTAGES OF OUT APIARIES—HOW, WHEN, AND WHERE TO MOVE THEM.

By B. O. Lott, Anson.

In selecting this subject from among the many which we might profitably discuss at this meeting, I made the choice believing that, generally speaking, the majority of beekeepers have had little experience with out-apiaries.

I shall reverse the order of this subject, and say to first ascertain if near your home apiary—I use the word near, for I consider it very important for spring building—you have a good supply of willow and soft maple, alder, poplar, hard maple. honeysuckle, moosewood, wild plum, billberries, and other spring flowers. If so, there will be no necessity to move early in the spring. If not so fortunately situated, then select a locality along the lines I have mentioned, where there are also plenty of orchards, and, if possible, raspberries, clover, and basswood.

How to Prepare to Move.

First, a hive for moving should not have iron or tin straps for the top box to rest upon but should rest upon wood, as the bees will propolize more quickly to wood than iron. Next, it will be necessary to have screens for the tops of the hives. These are made of inch and a quarter strips, dovetailed at the ends, made exactly the size of the hive, with wire cloth for covering, and they can be fastened by small wire nails to the top of the hive. Then fasten your botom board with whatever fastenings you may have. I prefer Vandusen clamps. Put on your entrance screens, and they are ready to move. I might also add here the reason we prefer the clamps. In moving in July or August you can remove the bottom board ,and with a screen, the same as on the top, with a screw nail in each side, place the screen beneath the hive with the wire-cloth next to the hive, fasten down your clamps, and they have ventilation at both top and bottom.

Where to Move.

In the old settled part, such as Prince Edward and the southern parts of Hastings, Lennox and Addington, Northumberland, and Durham, linden is something of the past: while in the northern parts of the same counties, linden, or basswood, as it is commonly called, is quite plentiful. Following out the plans which I have already mapped out, with several railways running from south to north, and with good waggon roads, it is a simple matter to move an apiary fifty or sixty miles without any loss whatever. We have learned also by experience that in placing hives in cars for shipment always place them so that the racks hang lengthways, instead of crossways; whereas, shipping by waggon the reverse position is necessary.

With us beekeepers in Hastings, we ship our bees north for linden and clover, south to the County of Prince Edward for buckwheat, and back home for winter quarters. By following this course we usually get a fair crop of clover, linden, and buckwheat honey. Time will not permit to go into all the details of moving, but I trust enough has been shown to clear the way for any new or old beekeepers situated in a locality where there is not an abundance of clover, basswood, and buckwheat, and other honey-producing plants.

At the close of his paper Mr. Lott explained that owing to an enforced absence from home for nearly four weeks, he had not had an opportunity to devote as much time to the subject as he would have wished, but he trusted the paper he had prepared would be of some interest to someone who had, perhaps, very little experience with out-apiaries.

Mr. Holmes: Not having had the advantage of knowing the subject matter contained in the very excellent paper given by our friend Lott, I am placed at a little disadvantage. However, in the course of the paper there were some suggestions that came to my mind, and I shall take the opportunity of telling you that, owing to the fact that I have not worked in out-apiaries, my suggestions will be more theoretical, and not practical, from my standpoint I was wishing he had referred to the advantages from local showers, which might accrue from having apiaries scattered over a radius of perhaps ten, fifteen or twenty miles. Perhaps in one locality the honey flora might be badly scorched, and just a few miles further on the advantage of showers would give the beekeeper in that locality a special advantage. Another matter upon which I am sorry he did not inform us was that of store-rooms at different places. If I were engaged in it I would wish to have the store-rooms at the different places, so that the honey would not have to be removed from the out-yard. Another matter I was sorry he did not refer to was as to whether he used the same set of extracting utensils in connection with his work, or a separate and distinct set for each out-yard. I think these points might be referred to, and I would consider them advisable, necessary, and best if it was my case. I do not bring these points up as differing from Mr. Lott, and I do not propose, either, to kick any holes in the very good paper to which we have listened.

Mr. Lott: I do not know that I could answer the question of Mr. Holmes satisfactorily. He wished to know if, in moving our bees in different localities, we were blessed with showers, and such things as that. I might say it would be necessary to have some direct communication with the Supreme Being to know as to that. As to the utensils which we use in apiaries, we usually use the whole apiary, so that in taking one or two carloads to different localities we usually take our extractor and other appliances with us. I am here, and will be pleased to answer any questions which I possibly can from a practical standpoint, so far as my experience goes.

Mr. Dickenson: In the case of a man having an apiary with one hundred or one hundred and fifty colonies all ready with the frames resting on tin supports, what would you do in moving them?

Mr. Lott: Do as I did—remove the tin and replace it with wood. I started out with tin rests for top bars, and in shipping either upon train or waggon we found that the bees would not propolize the rack to the iron, and consequently we used to have to nail strips across the rack in order to hold them. We found, also that after discarding the iron rest bars and letting them rest upon wood, it was not necessary to strap a rack down with the strips, but the bees would propolilze them down in such a way that we rarely ever found a rack misplaced or moved. If I anticipated moving my bees to other localities, I think I would, for the little amount of labor connected with it, remove the iron bars, and if then you have not the proper bee space below, put your strips under your top bars at the end of the rack.

Mr. Hall: Does the handling of those frames without the tin rests that you have removed compensate for removing them?

Mr. Lott: I admit it is not as easy to handle frames resting upon wood as upon the iron bars, but, speaking from experience in moving and shipping bees, I think you will be well repaid for the amount of extra labor by the saving to your combs and to the death rate of the bees. We used to lose a great many bees in shipping, but after we discarded the iron bars the death rate was very small.

Mr. Post: That was when you handled them on waggons?

Mr. Lott: Yes.

Mr. Post: All but about 150 of mine have metal rabbets, and I cannot see one particle of difference. Our top stories have all metal rabbets, and they are moved in August with the top stories on. If we moved them on waggons I think they would be out of place, but they are carired on hand barrows to the car, and I never saw one shifted. If I were to build five hundred to-morrow, I would have every one with metal rabbets.

Mr. Hall: I have had a little experience in moving bees to out-apiaries and returning them, and my hives and supers all have metal rabbets, and the difference in handling those bees, when you come to the honey crop, is so great that it pays you. Some of them got together, but not many. Most of them have little brace combs. I move mine with top stories on when I move them to the buckwheat, because otherwise they would smother. I think I would not take our friend's advice about taking off the metal rabbets. If I had to do that, I would put a block of wood between the metal rabbet and the end of the hive.

Mr. Holtermann: In this question of out-apiaries I believe I can help my friend Lott out, who I know is a practical man. What he says is perfectly correct. If you put the metal rabbets there, and you have your bee space above the frames, there is more or less danger of those frames shaking loose. Of course, as Mr. Post says, if you are moving them on trains that is less the case, but there are not very many of us who can afford to do that. If you leave your metal rabbet there, and put your bee space below instead of above, you remedy the whole matter. The moment you put your queen excluder on, its frame has practically pinched down the end bar, and if you put your cover on, that pinches down the frames, and thus you prevent them rocking.

Mr. McEvoy: If our friend had to ship one hundred colonies two hundred miles, would it pay to move them or leave them?

Mr. Lott: I am situated in a locality where there is clover, but very little basswood. If I kept my bees there, and it was a good clover season, I would perhaps get a good crop of clover honey; but if I did not move them where there was basswood I certainly would get very little. I am in a poor buckwheat locality, but by shipping fifty or sixty miles to Prince Edward, where there are thousands of acres of buckwheat within a radius of five or six miles, we usually get a good crop. Generally speaking, railways charge outrageous rates for bees or fixtures, but we are more fortunate here, particularly with the Central Ontario Railway, which runs eighty-five miles north through a well-wooded country to the Town of Picton, through nearly the whole of Prince Edward, which is noted for its buckwheat. We can ship to advantage, and we get very reasonable rates. I think it would pay any man who is in a locality where linden, buckwheat, or clover is scarce, to ship his bees fifty, sixty, or one hundred miles.

Mr. McEvoy: Would it pay to ship them providing it cost fifty cents a colony?

Mr. Lott : If there is a scarcity of nectar, and no flow of honey, perhaps it would not pay ; but, generally speaking, it does pay us well. If my friend Post left his bees in Trenton, where he lives, he would get a couple of tons of honey. When he ships them out back of my place it is quite a common thing for him to get ten tons of honey.

Mr. Post : Mr. McEvoy is interested in the difference in profits in moving them. It is all chance. We could not answer that positively. We do not move our bees anything like two hundred miles. We might take our bees from one locality which was poor to another which we thought was good, and there might come local showers across that favored spot, and the bees would do splendidly, whereas five or ten miles beyond they would get hardly anything.

Mr. Armstrong : Would it not do away with all this trouble of taking out the metal rabbets and replacing with a piece of wood underneath if we used a good self-spacing frame, and have bee space on top ?

Mr. Lott : I have had no experience, but I would not think it would. The only trouble is with the frames shifting together, killing bees and rubbing the brood. This is about the only disadvantage I know of along that line.

Mr. Holtermann : It will not do if you take a proper self-spacing frame. I say that advisedly. After years of experience with a Hoffman frame, I do not believe any man who runs out-apiaries can affort to have them. They stick together, and there is difficulty in getting them apart. A man who is running out-apiaries wants to be a rapid manipulator, which he cannot be with a Hoffman frame. If he takes his frame and drives a staple to properly space on one side of the top bar, and then turns the frame over and drives one near the opposite end, he has two staples in the top bar, which act as self-spacers. I got this idea from Morley Pettit. Even when the frame is spaced with a staple, it will still rock. Now, have bee space below the frames and the top bars are held firm.

Mr. McEvoy : Mr. Hall has moved bees, and he has got a good deal of honey sometimes, and I ask him if it does not pay pretty well ?

Mr. Hall : I am too old to move very many bees. If you want to keep your metal rabbets, if you want to move them rapidly, you can manage that by simply putting in a piece of wood under the end of your frame behind your metal rabbet, and you can take it out when you get there if you choose. I do not move on trains, because they are exhorbitant. We have to move on waggons, and in this way the frames do not need to be fastened in any shape, and if you want to go into your bees when they are in the out-apiary, you can do so in one-sixtieth part of the time by simply having the metal. With me, with one exception, it has always paid to move to the buckwheat.

Mr. Lott : Mr. Hall might be right, but I am satisfied with our system. I could not agree with our friend Holtermann. In shipping the top stories, as we do for extracting, with those staples in your rack I do not know how you would use the capping knife.

Mr. Pettit : Start at the staple and cut down from it.

Mr. Lott : I always cut up.

Mr. Pettit : Then hold the frame with the staple at the bottom.

Mr. Newton : I have something which I think is ahead of fastening the frame. In shipping or moving bees my screens always set down on the top bar with four screws, and they hold them perfectly solid, and by taking out the four screws the frames can be moved just as you wish.

Mr. Holtermann : What do you do when you set another hive on top of the first ?

Mr. Newton : Put a piece of wood between the bottom and top, and fasten with a clamp or whatever you use, and then your screen goes on top.

Mr. Morrison : I think probably the screens I used were after Mr. Newton's pattern--an inch and a quarter square, fastened at each side near the end with inch and a quarter screw nails. Three-quarters of an inch of that frame rested on the top bar, and when they were fastened down tight I found when I had removed them on a lumber waggon there was not a frame moved, and they were all on metal rests.

Mr. Hall: Mr. Newton uses the screens I use, but when he has one hive on top of the other, he cannot use that screen on the bottom hive, and he does not need it there. I do not even use the screw—simply very fine, long wire nails, and put four of them in. The top cannot move, and the bottom does not move. The screen does not touch the sides of the hive at all; it simply rests on the end of the frame.

Mr. Holtermann: If you went on the non-swarming principle, looking to your bees, they would not be propolized.

Mr. Hall: They are not propolized down, but there are brace combs which keep them together.

Mr. Morrison: Does the end of your top story press on the frame below?

Mr. Hall: It does not in my case. If I put a screen on the top story or on the brood nest, it then rests on the screen, as Mr. Newton says. The ends of the screen are deeper than the sides of the screen, and the ends rest on the end of the bar.

Mr. Morrison: With mine it would. My frames come plumb with the top of the hive.

Mr. Pettit: Out of over two hundred stocks that I have put away for the winter, I do not think I would find three hundred burr combs in the brood chamber between top bars. This is due to correct spacing of combs. If you have a bee space underneath the combs, as Mr. Holtermann has said, you have the bottom of the super resting on the queen excluder, and the top bars or the cover on the top bars, as the case may be, and you have your combs held firm. We hear a great deal about moving bees for better pasture in different places on account of the difference in weather, showers, drouth, and all these things, but I think in the long run we will average up just as well if we stay just where we are. Moving for buckwheat is a different thing.

Mr. Armstrong: I would say that it would pay. I have moved bees for the last ten or fifteen years. I have shipped them on cars, and the highest rate I ever paid was $1.50 a colony, and that was from my place to New Brunswick. I do not think it will ever be necessary for any person to move two hundred miles for fresh pasturage. About seventeen miles is as far as I move, and I have never moved them yet but what it paid, and paid well. I do not quite agree with Mr. Holtermann about the frames sticking together. I think in moving bees we wanted them to stick together. If you have everything arranged all right, with the right space, you will have very few burr combs. I can take out three frames at once with the self-spacing Hoffman frame, and you cannot do it with any other frame except by adopting the method which Mr. Hall uses.

Mr. Hall: It has paid me every time I have moved these, with one exception, when the Lord did not give us any honey. It cost me fifty cents a hive to get them there and back again.

Mr. Lott: There are years we do not get a surplus of buckwheat honey when we ship south, but usually we get enough for winter quarters, and we are amply repaid then. Generally speaking, after running for a crop of clover honey, extracting from the 1st to the 10th of July, then comes the basswood, about the 12th July to the 26th or 27th, and then shipping from the 1st to the 5th of August to the buckwheat field, our hives are usually very light, and then they are usually filled up well for winter quarters if nothing else. An advantage to anyone who lives along the lakes is that you can ship very reasonably by boat. Also with a local railway you get better rates than upon some of the larger railways. Generally speaking, it pays as well to move.

Mr. Byer: There is one important element which Mr. McEvoy, I think, is forgetting to take into consideration, and that is the element of chance.

Mr. Darling: With regard to keeping frames firm while moving bees, I would simply put two springs right on each side on the end of the frame, and hold them down on the rabbets. My frames hang crosswise of the hives, and I have never had a frame get out of place. I hold them down with wire nails or screw nails.

Mr. Pettit: From the general opinions that have been expressed I think the question resolves itself down to whether your space is above or below the frame. Each man who gets up to speak must let it be known whether his space is below or above. If above, I would prefer that mentioned with strips to hold down the frame; if below, the top bars come even, and are held down by the queen excluder, or cover, or whatever it is.

Mr. Darling: Even with the space below, the frame on top, I fancy, I should put the strip on, and then the frames would not slide.

Mr. Edmonson: Do you nail each frame separately?

Mr. Darling: No; two nails in each strip; four nails in a hive.

Mr. Sibbald: When Mr. Pettit comes to put the third story on from the bottom, does the bottom edge not catch tight to the frame—that is, propolize to the bottom edge of the hive?

Mr. Pettit: If everything is square and even, and nice and snug, the propolizing does not amount to anything.

Mr Sibbald: You understand what I mean. If it is a nice, snug fit, the hive will just rest even on the top of the frame, and on the other half, at the end of the hive, it will be stuck to the bottom, and when you pry the top off probably two or three of them will lift, and they will drop down again and annoy the bees very much.

Mr Pettit: Turn it sideways and slide it.

Mr. Sibbald: That is all right with your staples, but if you had no staples there it would slide the whole thing.

Mr. Pettit: I could not keep bees without staples.

Mr. Dickenson: Mr. Pettit recommends running the capping knife down. I think Mr. McIntyre is on record in our November Bee Journal as saying "always cut up."

Mr. Hall: We all of us have different methods, and all have found out how to rock the cradle and keep the baby quiet. Those who have the space below, and those who have the space above, and those that have loose and tight frames are all right, because they run them to suit their own hives.

Mr. Pettit: That is the point exactly. We all have different things, according to our own management. From my experience of years without staples, with frames hanging loose and then using the staples, and spending hours driving staples in the frames that have not had them, I would not think of pulling out the staples and going without them again.

Mr. Lowey: I use the metal rabbets, and would not have a hive without them. I simply pick them up when I want to take them away, and simply pick them up when I want to bring them home. I do not, perhaps, move far enough to want a screen on top, and I never have any difficulty. I would say to everyone, never use a closed end frame or a frame with any spacing without a metal rabbet. I have read something about cutting out the queen cells, and when I heard about going through the hive I thought I would ask what the object of doing that was—whether it was to prevent swarming or what?

Mr. Sibbald: I don't think it is very much use cutting out queen cells to prevent swarming.

Mr. Hall: When we take them out for the buckwheat we never go into them for any cause except from the top. We do not take them out for white honey, because we have them where the white honey is. We look into them every week, and if they are prepared to swarm we simply divide them up and take them out.

Mr. Holtermann: I think the information Mr. Lowey wants is as to whether it is through the entire season.

Mr. Hall: After July we let them take their fling. If they go to the woods we bid them good-bye.

Mr. Holtermann: I would not like to not go through the hives for cells. In this matter localities vary very much. I had for years been trying to follow Mr. Post, because I knew he was a good beekeeper, and he said he had no trouble with swarming under certain conditions. I found under those same conditions I did have trouble with swarming, and I attribute it in all honesty to locality. I believe the sections were there is less trouble with swarming is where the clover comes, and then it breaks. There is a dearth between clover and basswood. Then basswood comes on, and as a rule we are troubled as much with swarming there. It is short and sharp, perhaps, and then there is a break again. Then you come to buckwheat. They have entirely gotten over the swarming impulse, and if that does not last too long you will again not be troubled if you give them plenty of room. In the localities in which I work more or less, that is not the case so much. The nature of the soil is such that under ordinary circumstances the clover is carried right along into the basswood, and it is a long flow. And even with that twelve framed hive, so much despised by some, which I use, and with two or three supers on, they will even then get swarming impulse, and it is necessary to go through and examine carefully for cells and break them down. I am not going to say it pays to do that. It is a great deal of work, more than in extracting. But, what will you do when you are running out-apiaries? Certainly I know I would have lost quite a few swarms if I had not done it. Where breaking down queen cells especially pays is, that if you are pretty near the end of your flow and you break down your queen cells and check it for those few days, then they are brought to the point where they will not swarm any more.

Mr. Hall: Mr. Holtermann has just hit it for my locality; I do not break down my cells, that is all. With out-apiaries where you can only go once every eight or ten days, we go through every one, and we have records on every hive. My memory is short. I cannot remember what I do with each hive. If we break down our queen cells or take the brood away, or take fifty pounds of honey, that all goes onto the slate. Putting the screen under the bottom will retard swarming, but in no case will it prevent it.

Mr. Darling: I have never made a success of breaking down queen cells. After the cells have been broken down once or twice, the bees will simply swarm and not leave any queen cells behind. The only advantage I found in breaking them was to prevent after-swarms.

Mr. Pettit: In connection with breaking down queen cells, the point is as to how far advanced they are. If they are only eggs, it works all right and retards them for another week, or perhaps does away with the swarming entirely. If the queen cells have larvae in them it is risky.

Mr. Dickenson: I do not think we could recommend cutting out queen cells when there are just eggs in those cells. I think we might overlook several cells and our labor will be for nothing. Whenever I notice any eggs in a cell, I simply go to work and hive my colony. I do not wait. I run my bees; I do not allow them to run me. Instead of waiting till the sun is very hot, and have fifteen or twenty swarms come out in a day, I have thirty in a day, and take a nice cool day for it. I do not see wherein it is necessary to cut the queen cells out if you do that.

Mr. Chisholm: Is it dangerous to move at this time of the year?

Mr. Post: I should say it was not.

Mr. Chisholm: I moved fourteen colonies the week before last, and after I got home people told me it was dangerous to them this time of year.

Mr. Holtermann: Where are you going to winter them?

Mr. Chisholm: They are wintering in cold storage. I moved them for R. I. Graham, of Belleville. I was in there on Saturday, and I should say they were from five to eight degrees above freezing. I told him they were too cold. I told him he should keep it to fifteen degrees if possible.

Mr. Holtermann: That is all right.

Mr Armstrong: This is something new to me. I think if this gentleman keeps them in cold storage they will stay there till next summer, and he will not have any trouble with cutting out queen cells.

Mr. Holmes: My experience in cold storage has not been a very pleasant one; but jokes aside, if our friend is wintering his bees where it is from five to eight degrees above freezing I would say they are in very good temperature.

Mr. Edmonson: I could like to ask Mr. Hall a question. You say you go through your hives once a week or eight days, and if you see a colony preparing to swarm you take the bees out.

Mr. Hall: Take the brood out.

Mr. Edmonson: What do you do with the brood?

Mr. Hall: Oh, various things. I do not shake off all the bees first; I set them down alongside of the new hive, and when I go the next week I make it my business to shake them all off.

QUESTION DRAWER.

Q.: How do you provide for the prevention of pollen in section boxes when working on the contraction system and narrow strips of foundation in the brood chamber when hiving swarms.

Mr. Pettit: In hiving swarms on starters we use starters and one working comb. This one empty worker comb catches the pollen and prevents it going up into the sections. We also find a queen excluder is a help.

Mr. Sibbald: I would not agree with having one empty comb. I think that would start comb-building all the way down below, and keep them down below. That is not what they want.

Mr. Pettit: I know by experience we do not have that trouble that Mr. Sibbald has mentioned.

Mr. Sibbald: You get your bottoms filled with comb.

Mr. Pettit: They are working in the sections at the same time.

Mr. Sibbald: Slowly, and not so fully.

Mr. Pettit: I think this question is one of locality, and those who have not had trouble with pollen in sections do not need to consider it. In some sections the bees do not get pollen enough, and in others we do not know what to do with the pollen. Unfortunately that is the case in my section.

Mr. Vincent: By putting one frame of drawn comb in with starters, I would like to ask if there would not be more drone comb built?

Mr. Pettit: Yes; that is the objection to the system. I have not been able to keep the pollen out in any other way.

Mr. Gemmell: If you limit the number of starters in the brood chamber, it will not be so bad—say five starters and one empty comb. The more empty frames you have in the brood chamber the more drone comb you have.

Q.: When rendering wax, what is the best method of cleaning it of propolis, which, I find, melts and combines with the wax?

Mr Pettit: The only method I know of is to keep it out of the wax before it goes into the wax extractor.

Mr. Brown: I would like to know how you do that?

Mr. Pettit: We do not find propolis on the combs themselves enough to do any harm except what is stuck on the edges of the top bars and around the frames, and when you are scraping frames do not scrape that in with the wax—scrape it outside.

Mr. Post: Will wax and propolis mix?

The President: No.

Mr. Hall: Both in propolis, and also in bee pollen, if you have two vessels of anything that will keep warm, make it hot, pour it into your vessels and pour some boiling water to fill it up. Shut it down with a cloth, and let it alone, and your propolis and pollen will be found at the bottom every time.

Mr. Holtermann: I rather agree with the idea that there is not anything in propolis proper that will melt; it is simply the wax that is in it already, and I would object, as far as color goes, more to the pollen getting in than the propolis.

Mr. Hall: If you give it time to cool the propolis will be next to your wax and below that the pollen, and the pollen you can wash off with your hands. The secret is to keep it hot so that it can settle.

Mr. Holtermann: I always look with gratitude towards all that Mr. Hall and men of like experience have taught me; but I think a quicker way to get rid of propolis and pollen is to strain the wax when it is hot, and if there is any left it settles.

Mr. Hall: We strain it to catch any chips, bee wings, or anything that may be in it, but not for pollen or propolis.

Mr. Holtermann: You think the propolis really does not melt?

Mr. Hall: It does not; and if you give it time to settle it will be in the bottom.

Mr. Gemmell: I can corroborate Mr. Hall.

Q. Has anyone had any experience in using this sample (produced) for foundation?

Mr. Pettit: This, as far as I can make out, is pure paraffine. I am not a foundation manufacturer, and I would like to hear from those who have had any experience in using this for making foundation. So far as I am concerned, I hope none of them have. If they had I would not like to patronize them.

Mr. Brown: This sample has been sent to me, recommended strongly as being used in Europe to a great extent for making foundation for bees. I would like to know whether any of the gentlemen present have had any experience with it.

The President: From the nature of that it would be impossible to make foundation out of it, but it might be adulterated with some other wax by means of which foundation could be made, but it certainly never would answer.

Mr. Lowey: I think I have had a little experience with foundation adulterated slightly with that. I do not want any more. I lost both in pocket and conscience. I hived swarms on it, and I put in the sections. I did not understand what was the matter till I used up several pounds. I defy any man to adulterate beeswax with anything, and have it workable, even if he is disposed to. I hope no beekeeper is. I believe there is no substitute for wax that can be worked by the bees at the proper temperature.

Mr. Morrison: Some years ago I remember Mr. D. A. Jones telling me he had made foundation from wax produced somewhere in the neighborhood of Ottawa, and after it was manufactured and put into the hives it all melted down. He sent some of it to be examined. It was reported to be paraffine and beeswax mixed. When he tested it, after he found out what was wrong, it melted several degrees lower than beeswax would. If paraffine mixed with beeswax would do it, it is certain paraffine alone would.

Mr. Sparling: This material is cerasene, not paraffine.

The President: They are from the same product, petroleum, and one is refined to a greater extent than the other.

Mr. Sparling: Prof. Shutt said this was a dangerous product, because it melted at practically the same temperature as wax.

Mr. Newton: Two years ago I received quite an amount of wax to make into foundation. Some of it was similar to what has been shown here this afternoon. I tried different ways to detect the adulteration, and I found they both stood about the same amount of heat within three degrees, and yet I could not make foundation out of it, and I returned it.

Mr. Vincent: I have heard of tallow being used to adulterate wax.

The President: Wax is to quite an extent adulterated with tallow, but it is very easily detected by anyone with any experience. Paraffine is not detected so easily.

Even resin has been put in with beeswax with paraffine with the object of hardening it, but it will melt no matter how much resin is put in.

Q.: What size of hive would you advise for a colony?

Mr. Pettit: The size of hive I have used with a large measure of success is equal to the ten-frame Langstroth hive. This is a splendid comb honey hive. It is a good hive for extracting honey, but I think from experience for my locality the brood chamber is not quite large enough. I have placed my order for one hundred twelve-frame Langstroth hives for next year.

Mr. Dickenson: I think this is quite a change from what our bee journals and supply men have been recommending. The eight-frame Langstroth has been the standard; and when men follow the recommendations of the bee supply men, and those who have made a study of what is the best hive, and have also read our bee journals, they are at a loss to know what to do when they have got their apiary up to one hundred and fifty colonies or more, and two or three hundred extracting supers that they cannot get more than eight frames into. Mine hold nine; fortunately I am one better than eight. I really do feel for those people who have been recommended to use the eight-frame hive, when I heard such an able man as Mr. Pettit recommend the twelve-frame.

Mr. Pettit: I am always anxious to have advice, but I always want to work from my own experience, and every year I find myself adopting new ideas and changing my plans. If my queens could not produce more brood than the eight-frame hive would hold I would not have them. As to this two-storey hive arrangement with the Langstroth depth, I have tried the two-storey brood chamber to a limited extent, and my experience has been that the lower brood chamber is largely deserted by the queen and bees. The queen goes up into the upper story and in the course of a few weeks when brood hatches out from below it is like a deserted hive.

Mr. Gemmell: That has never troubled me.

Mr. Holtermann: It has me.

Mr. Hall: Mr. Hall is an old-fashioned fellow, and he has the old-fashioned hive. and you must not laugh at it, if you please. I commenced twenty-seven years ago with what was supposed to be the Quinby frame, and instead of being the Quinby frame it is 1 1-2 inches longer, and my little hive contains equal to eleven frames Langstroth, and if I had any change at all I would want one or two more frames Langstroth added to it, but I have got all I want to use for my lifetime.

Mr. Byer: I think Mr. Pettit is quite within his right in advising any size he wishes, provided it is not an eight-frame Langstroth hive. Personally I want a ten or twelve-frame hive, only I want it two inches deeper than the Langstroth hive.

Mr. Holtermann: I believe there is a rapid change in the direction of using a larger hive. I believe in five years from now we will find a very great increase in the percentage of large hives used.

Mr. Webster: I believe in the deep hive. I have been at the bee businss for over forty years, and I like plenty of room, plenty of air at the bottom, and plenty of coolness in the top. Do not contract the bottom; it encourages the bees to swarm every time. Plenty of ventilation at the bottom, coolness in the top, and a good brood chamber. Where I live we do not get the bees if we do not have the size right.

Mr. Pettit: We do not get honey without bees, and to have bees we must have the hive to contain the bees.

Mr. Dickenson: Do you run the three stories, twelve frames?

Mr. Pettit: One brood chamber and two supers for extracting.

Mr. Dickenson: It is very necessary every time to do that. That is thirty-six frames. A pretty large hive.

Mr. Pettit: That is the size of hive I have used this last season, and have my largest yields from it.

Mr. McEvoy: Mr. Pettit is on a twelve-frame hive, and there are a good many going that way just now. I have eight, nine, and some twelves, but I am going to put the twelves out of business. I can take more honey with the nine than with the twelve, and I can get a better profit in the way I manage it and work it.

Mr. Pettit: That comes to the question of management again.

Mr. McEvoy: But if I were to use them on that plan, and use the brood chamber as a brood chamber and nothing else, it would manage me out of the business.

Mr. Holtermann: What frame do you use?

Mr. McEvoy: It is not a question of the size of frame, but of the size of the brood chamber.

Mr. Dickenson: I think it is a very important question; it pertains to the whole industry. You want to get your clover honey away before your basswood comes on, which is a very important thing in this Province in shipping to the British market. I am very sure that we must do that in order to get a large amount of our honey out of our local market. If we have too large a hive I am afraid there will be difficulty in getting quite as much ripe honey.

Mr. Pettit: That is a very important question. I do not need to keep my clover separate from basswood.

Mr. Dickenson: Until we do that, in good seasons we will have just such a glut as we have at the present time. Had the eastern part of our country had as large a flow as we had in the central or western part, you would have had a much larger glut than you have at present, and until you take into consideration the importance of keeping your clover separate from your linden that will be the case.

Mr. McEvoy: That is one of the most important things to-day, because mixed honey will not go well in the British market.

Mr. Holtermann: I cannot see just exactly where the point comes in there in connection with the large hives. I know it is exceedingly important in the British market that clover honey should be sent there and not basswood, but in a great deal of the management now with the smaller hives fruit bloom comes on and a great many of the bees in the hives swarm in the early portion of the clover. Now you have got your stock fed up. You have got those two stocks occupying eight-frame hives, and if you are going to take extracted honey you need a super, and eight times four is thirty-two. I believe by having a large hive and keping your bees contented and quiet, and not getting the swarming impulse that the four frames with the two supers is more than made by that line of management. If you are not getting honey enough to utilize two supers you will not use them. Mr. Dickenson's point is a good one about not mixing your honey, and yet I do not see that there is a very great difference there on account of being able to prevent the swarming with the larger hive.

Mr. Dickenson: Mr. Holtermann said something about management. That is just where it strikes me as a question of importance. In management. I want to take off my honey from the third storey, and I think Mr. Pettit will agree with me that it is important to have the clover honey separate from the basswood.

Mr. Pettit: Yes.

Mr. Dickenson: In order to get as much of our clover honey ripe as early as possible I do not want to have too large a hive; I am afraid my clover would be cut down: I would have too many of those combs not capped because I had put too many on for the upper story. I think I would have several thousand pounds less.

Mr. Pettit: We must keep clear the distinction between large brood chamber and large hive.

Mr. Dickenson: It is just as possible to have a large brood chamber with an eight or nine-frame hive as with the twelve. As soon as the bees are ready to swarm you artificially swarm.

The President: You are assuming that your extracting combs are the same depth as your brood combs?

Mr. Dickenson: Exactly.

Mr. Pettit: Mine are not all the same. In any case we want the large brood chamber, according to my view. If you want to keep the basswood separate from the clover just put on one extracting super; it means a great deal more work during the swarming season, because with the two extracting supers you do not need to extract till near the close of the season.

Mr. Newton: I agree very much with Mr. Dickenson. I can hardly see what Mr. Pettit is trying to get at at the present moment, because I do not think either Mr. Dickenson or myself would put on two extracting supers at once. We generally do not put the second one on until the first one is at least two-thirds full. With regard to the twelve-frame hive retarding swarming. I do not think it makes a bit of difference. I have worked with sixteen-frame hives, and I have seen just as many swarms out of those.

Mr. Holtermann: Were they alongside of one another?

Mr. Newton: Yes.

Mr. Holtermann: And one swarmed as soon as the other?

Mr. Newton: Yes. At the same time I think these were eight different styles of hives in the same yard. I think when the bees get the swarming impulse they will swarm out of one just as quickly as one of the other, and I would sooner lift away an eight-frame hive than a sixteen-frame hive.

Mr. Darling: I think this is a question largely depending on the size of the colony of bees, the size of the man who manages the bees, and the size of the locality. I use a hive, and have for years, that is somewhat larger than that hive Mr. Hall talks about. I think he has twenty-eight hundred cubic inches; mine has thirty-two hundred. I have seen mine swarm time after time when it was not over two-thirds full. They will swarm, other conditions being satisfactory. They will not swarm if the conditions are favorable to their storing honey.

Mr. Pettit: In my opinion where you delay putting on the second super until the first one is nearly full, is just where you miss it in retarding swarming. The great point in my experience, and in my reading, has been to give plenty of room, and give it before they have any notion of swarming.

Mr. Webster: You must go according to the swarms; there are some medium and some strong. When you get up to a certain point, give plenty of room at the top and plenty of air at the bottom. I have kept my bees for weeks and weeks without swarming at all. Take the honey from them; do not let them get ahead of you.

Mr. Pettit: In order to answer any question, we must describe our whole system in beekeeping because it is all involved and every man has his own system. No man should start the white honey flow without his colonies being good and strong, strong enough so that an extra super on top would not chill the brood.

Mr. Newton: Do you put on your three comb honey supers when you start?

Mr. Pettit: That is different from extracting.

Mr Newton: I do not think so in that connection.

Mr. Gemmell: As regards the size of hives, I think the locality and management have a great deal to do with what hive is used.

Mr. Lowey: I use a nine-frame Langstroth, or a little longer hive. If beginning again, I would not have less than ten frames. You can make it as small as you wish with that. With an eight-frame hive you cannot make it any larger. I put on three at once for foundations, and in this very poor season with us they filled them. They were filled with bees; there were swarms larger than I am—several swarms together.

Mr Hall: I believe bees are like almost anything else—you can educate them to do certain things. If you use a small hive from year to year, your colonies will not want a larger hive, and they will not fill any more with brood; but I have had the large hive, such as I use, on the 24th of May with several of those combs full of brood, and the other half full. I have also the Hedden hive, but I never got so many bees in them as in the large frames, eighteen and one-quarter inches by ten and a quarter inches deep.

In a normal condition when they swarm there are not three pounds of honey in that hive it is full of brood and just at the very corners a little piece of honey. I keep a record slate on every hive I have, and I give credit to any extra stock I have. I start with No. A. A 1 means better than A ; A 1 X means breed from that queen ; A 1 XX means breed from her all you can. Those that do not fill up the hive, we naturally call them B. You never can give them too much room in the brood nest before they swarm. When we contract is the time for swarming, if at all, but never before.

Mr. McEvoy : I use a nine-frame hive, and I want eighteen frames of brood, and that will put any twelve-frame out of business.

Mr. Armstrong : Taking the whole season through, has Mr. Hall two sizes of brood chambers ?

Mr. Hall : Yes.

Mr. Armstrong : Which hive gives you the most in dollars and cents in a season ?

Mr. Hall : The old standby I have had for twenty-seven years. I have had them give me as much as 228 pounds of section honey coming on the 28th of June. If you can do that from any small hive, I would like to see it.

Mr. Armstrong : Was that the average for all the hives ?

Mr. Hall : No, I am sorry to say. I wish it was.

Mr. Webster : With me the Hedden hive is just what Mr. Hall said it was with him.

Mr. Dickenson : We have got some of the most enterprising beekeepers in Ontario using the Hedden hive. Give me the beekeeper that produces the most honey.

Mr. Pettit : I do not use the Langstroth hive. I speak of ten-frame Langstroth, because that is the capacity of my hive.

Mr. Dickenson : Management comes in as far as raising up brood is concerned, but if a man has a large frame he cannot use up the brood the same as I can, because I have got a shallow frame.

Mr. Morrison :I think it makes a great difference whether a man is a professional, or is simply running it for a side issue.

Q.: What is the best method of feeding bees after they are put in winter quarters, and what is best to feed them ?

Mr. Hall : It does not pay to feed through the winter. If he has not fed them in September, it is better to kill them and save the comb.

Mr. Brown : A gentleman down in the Inland Revenue Department asked me that very question yesterday. The plan he proposed in feeding was to have the hive covered with an oil quilt, cut a hole in the centre of the quilt, and place the syrup in a super on top of the hive, so that the bees could come up through that hole in the quilt and take the feed out. The hives were not piled up one on top of the other.

The President : I think if time is worth anything he could buy a new swarm of bees in the spring just as cheap as he could fuss with them.

Mr. Timbers : I started to feed a swarm liquid syrup until I set the colony in the cellar ; after I put it in the cellar, I fed candy on top the whole winter, and that colony came out in the spring just as well as any.

Q.: What benefit has the Hill device under the cloth for wintering bees ?

Mr. Pettit : That is an arrangement which holds up the cloth over the frames so that there is a space between the cloth and the frame, allowing the bees to pass over from one space to another, going from one side of the cluster to the other, crosswise of the comb. The advantage I see in this device is that it allows the bees to move more freely from one side to the other, as the cluster has to move for stores or for other purposes. If there is no way for them to move over at the top, they must either stay where they are and starve or go down to the bottom of the comb and cross, and then up. Where it is cold at the bottom, they will probably get chilled before they get around. I find the Hill device necessary in outside wintering. I do not use it in the cellar.

Q.: Will bees carry eggs up from the brood chamber into the extracting super?

Mr. Pettit: I do not know. I know they will move them from one comb to another.

Mr. Gemmell: I agree with Mr. Pettit.

Mr. Switzer: I have had a number of hives this summer, and have had perhaps half a dozen, or maybe a dozen, cells in the extracting combs in the supers, and how they got there was a puzzle to me. It was drone brood.

Mr. Pettit: Probably the work of laying workers.

Q.: If you wished to get a new set of extracting combs would you use starters or full sheets of foundation?

Mr. Pettit: With the present price of wax I rather think I would use starters, but for general purposes combs built on full sheets of foundation are preferable because they can be used any place, and when filled with honey can be put into the brood chamber for winter feeding, and it is much better to have all worker comb if you can, but it is rather expensive.

Mr. Gemmell: You would have the foundation wired?

Mr. Pettit: Yes, where you are going to put it into the brood chamber.

Mr. Gemmell: Upstairs?

Mr. Pettit: That depends on the management. With the Langstroth length I think it would probably be better. Our comb is shorter than Langstroth, and I find no necessity for wires.

Mr. Newton: I believe there is money saved by using full sheets of foundation, with the price of wax as it is to-day?

Mr. Hall: Use full sheets every time.

Mr. Gemmell: And wire?

Mr. Hall: Yes; because you can have those extracting honey the first season without hurting your comb, and forever after.

Mr. Holtermann: I would fully endorse what Mr. Hall says about that. I think if wax were ten cents a pound more I would use it then.

Mr. Pettit: Do not understand me to say that using foundation is too expensive to pay. I am not fully decided in my own mind, because most of my extracting combs are drone combs, but I am inclined to think it would be better to work into the worker comb as much as possible.

Mr. Sibbald: It is pretty hard to stand up after a lot here have spoken and say something different. I believe that there is a natural secretion of wax on the bee in the honey season, and if they have any foundation supplied they have not any use for it, and you lose that much. I also believe it retards swarming a good deal to have them build their own combs in the super. I do not use full sheets at all.

Mr. Gemmell: I would let them build the combs down stairs in the brood chamber after they were hived.

Mr. Webster: I would give almost anything to have full sheets, and let them use the wax when they are drawing it out; and then there is this other very great nuisance—a lot of drone combs.

Mr. Hall: I go to work with a hive of bees with three supers on, and if they have not any drone comb below. I go into the centre of the nest and find a large piece without practically any honey in it. They are preparing for the queen to go up and lay or raise some boys. If they have foundation given to them they have not that privilege.

Mr. Brown: I believe every time in having full sheets of foundation, if it was not for any other reason than having food for the bees if a shortage in stores took place in the fall, which very often does occur. When I am extracting I put aside a few combs of the very best sealed honey I have, and then I have those to give to my bees in the fall. If half of those combs were drone combs, I would have a brood nest full of drones the next season.

Mr. Dickenson: I use full sheets every time in the top.

Q.: Do you think beekeepers generally in putting bees into the cellar for winter raise the hive from the bottom board and put small blocks of wood under?

Mr. Pettit: I do not know what beekeepers generally do, but I would most certainly do as this mentions: raise the hive from the bottom board and put in small blocks, or in some way give a much larger ventilation at the bottom of the hive than the ordinary entrance gives. I find it more convenient, and I think better to put the blocks at the back.

Mr. Chisholm: I turn my bottom board over, and give them a larger opening. I find no difficulty in giving my bees plenty of air in that way.

Mr. Darling: I find my bees winter a good deal better by putting an inch block under each of the corners of the hive, and closing the top down tight.

Q. Where is the best market for clover honey in barrels?

Mr. Sibbald: I believe there has been too much put in barrels.

Q. Would it be advisable to move bees early in March, and place them on their summer stands?

Mr. Pettit: It all depends on your locality. If the locality where they are to be for the summer has plenty of spring flow, that is the place to get them as soon as possible. In my experience the advantage of running out-apiaries and having bees spread out is in the spring flow as much as anything else. In the very height of the clover or basswood flow the locality can stand a great many more than it can in the spring.

Q.: If one-half of sugar syrup is added to honey, can it be detected, and if so, how?

Mr. Pettit: I am quite positive it can.

Mr. Chisholm: Would it granulate, providing that mixture was made?

Mr. Morrison: Two or three years ago some firm sold a great amount of honey through the northern part of this Province which they called honey syrup, in jars, with comb in it. That syrup, while it was mixed with some honey, could be told by anyone who tasted it.

Mr. Pettit: On the other hand, I have had pure clover honey that had been extracted several months and had lost its flavor, so that really if you did not know you would almost have thought it was sugar syrup. Chemists can analyze so as to distinguish the sugar from honey.

Mr. Holtermann: Has not syrup made from sugar a distinctly sugary flavor?

Mr. Hall: There is a vast difference in the flavoring of sugar. There are no two sugars alike; each one has its flavor.

REPORT OF HONEY EXCHANGE COMMITTEE.

By H. G. Sibbald, Claude.

The Honey Exchange Committee, appointed at Barrie, held a meeting in the office of G. C. Creelman in April. Present—Messrs. Newton, Chrysler, Couse and Sibbald.

It was decided to sell the honey of members through a reliable wholesale house; also to collect reports and advise members as to crop and probable prices. All members to have the right to sell retail and wholesale, as per circular issued to members.

The Committee met again at Woodstock on August 15, the Grading Committee also being present. It was decided that the price of honey in new, clean 60-pound tins should be 7 1-2 cents, f.o.b. Toronto; comb honey, $1.65 to $2.00. Grading rules were also drafted. A committee, consisting of the President and Secretary was appointed to confer with Rutherford & Marshall, with a view to their handling honey for members. We were led to believe that all would be agreeable; but only one member of the firm had been consulted, and when the matter was talked over by them together, they decided not to handle the honey, and gave the following reasons: Five per cent. was not considered sufficient, especially on comb honey. That members had already sold to firms in Toronto, contrary to their understanding of our proposal, namely, to give them sole agency for members' product in Toronto and other places named in prospectus to them.

While we failed to handle the honey this season, your Committee have done considerable work collecting and distributing reports, which was an object of the Committee. Grading rules were also drafted, which ought to be a lasting benefit to beekeepers.

Our membership increased to 62, and, after paying the travelling expenses of the Committee and printing, a balance of $7.65 remains, which ought to be very satisfactory to members.

Mr. Gemmell : Do you think from the present state of affairs we had better do anything further in the matter ?

The President : I should not think we should ask the Committee whether they want to give it up or not. Make them do what you think they ought to do. If you want to let them out of it, I guess they will be willing to drop out, but if you want something done, I think you ought to try to make them do something more. I would like to hear from Mr. Post.

Mr. Post : Unfortunately for myself, I was not in a position to attend the meetings at the time they were held, and I did not hear the discussions, and did not know any more of what had taken place than the other members who were here this evening. For my part, I would like to see it go on ; if anything can be done, I would like to see it accomplished.

Mr. Gemmell : My object was to find out. I have taken an interest in this matter ever since I was in California. I thought if there was no prospect of doing anything further that we need not waste any time in discussing it. I am not one of those who would like to see it given up. I thought probably the Committee would tell us some of the difficulties they had in organization.

Mr. Sibbald : One difficulty we met with was this : A great number of beekeepers would say to us, we are in favor of the idea, and believe it is a good one, but further than that they would leave us to go ahead and work the thing out. They would see what we would do, and say, "We will be with you if you get along all right." The idea is that of co-operation, and an Exchange cannot be very successfully worked unless all beekeepers come in. That is an idea I have held about it from the first. Some of our members think a number of beekeepers joined together ought to be able to do something. I do not see it that way.

Another thing is that when we struck the rules as well as we could, some of the members did not think they were all right ; and with reference to selling, they thought they ought to have the right to go into Toronto or any market and sell their own honey as they wished ; and it is difficult to get any man to take an agency for men who sell all they can themselves, and only give the agent the balance.

Mr. Gemmell : There is no doubt if we want this thing to succeed, there must be co-operation.

Mr. Pettit : There is always room for criticism, and we could all find fault, and I am afraid I am a little too good at that. I think a great work for the Honey Exchange, is the gathering and distribution of crop reports, and putting the members into a position to know the situation as it is. So far as controlling the output goes, we know that is a very difficult matter, because there are so many small producers throughout the country and they can put their honey on the market at any price they like, and it is hard to get them to join in. The first and greatest thing for the Honey Exchange to do is to give us an idea of the crop and the probable price, and the grading rules. That is an excellent thing. I mentioned criticism. I am not blaming anybody ; and I suppose the best thing that could be done was done this year ; but the grading rules and the prices we got came too late for the most of us.

The President: Would you suggest a workable amount of capital?

Mr. Pettit: That is a point I have in my mind. We cannot do anything without money. The Honey Exchange could not be expected to do anything this year with the money they had. That is a great point when it comes to handling the crop. The only way I see the Honey Exchange could handle the honey would be to form a stock company, as has been done elsewhere. The dollar membership fee that has been given in would merely help to gather statistics, as was done in a small way this year.

Mr. Couse: I felt a year ago in being appointed on that Committee you were giving us something to do that you did not know how to do yourselves. We felt a great responsibility in taking hold of it. The moment I felt my position on that Committee I did not see daylight through it. I can tell you I met Mr. Sibbald on several occasions through the summer. We spent a few hours trying to think what we could do. I always felt a weak point in this, we were not anything from the simple fact that we were not incorporated. We were not responsible to any member, nor any member responsible to us. They could do as they pleased; and we could do as we pleased. That is a weak position to be in. My own idea is that crop reports can be got as they were got this year, which I think was a considerable benefit to the members of the Exchange. I might say regarding the Grading Rules Committee we spent quite an interesting time in Woodstock for half a day. It was not any idle time there. We did not go there to spend our time foolishly at all. We were all busy. I felt that every member was trying to do something for your interests. I am satisfied they were. They had a hard load to pull. We found that there was a good crop of honey in the country, and a great crop of fruit. We felt we must reduce prices a little. We felt that they would not go over 7 1-2 cents for honey; we felt that around 7 cents was pretty near what it ought to be. We were pretty nearly right. I think you will find the thing has been carried out pretty near to the Committee's idea. They got all reasonable reports; they knew pretty well the situation. I think that kind of thing is useful to beekeepers. I think it can be done more extensively, and if this Association does not wish to form a joint stock company, my opinion is they can only go as far as making reports and giving them to the members. I am satisfied that some day there will be an incorporated company formed to handle honey, and I am satisfied it will be a great benefit to the country, because once you can supply large orders for honey from other places, carload lots, you will do business. Supposing we were to quote honey in the old country. Why, we are not anybody until we are incorporated. We could not refer them to any bank or to anybody. When you become incorporated, and hire a manager, and pay him a good salary, then you can go on and do a good business. It is for the beekeepers of Ontario to say whether they will do that. I should think, perhaps, you would need $50,000 to run a good business, and if you do, it will be all right. I think it will be a good thing for the country.

Mr. Morrison: I move that we print those grading rules in the report of this Association, and every member will then have them where he can use them.

Mr. Holterman: Were those grading rules for both comb and extracted honey?

Mr. Sibbald: Both.

Mr. Lowey: I second Mr. Morrison's motion.

The President put the motion, which, on a vote having been taken, was declared carried.

Mr. Chisholm: Is there any honey handled in the old country from here to any extent, and what is it worth?

Mr. Dickenson: I have not much to say about the price of honey in the old country. I just know what I am doing myself individually, and what I feel in connection with the honey industry with regard to the old country. I shipped six years, and I did not have any trouble to get what I call a pretty fair price. I think it will average in the six years what I could do in Ontario and in the Northwest Territories with the same quantity of honey, or perhaps a little better. Six years ago they were prejudiced against Canadian honey. I think that I will not have to come up against that in the next six years. The price of honey, like everything else, varies according to the crop reports from all over the world. I find California is Canada's greatest competitor. I do not know that I could just tell what the price of clover honey in England is to-day.

The President : I do not think that would be required of you. You have been at the trouble of working up your own market.

Mr. Dickenson : I have nothing to keep back. I welcome every beekeeper to come into my market ; it is an enormous market.

The President : You have an idea that there could be great quantities of honey disposed of in the English market ?

Mr. Dickenson : I think there could be—of clover honey. I do not think it would be wise to try to educate the people of England to take linden, or basswood, honey. I think they are much prejudiced against that honey ; consequently, I have never tried to sell a pound of that kind in England. There are one or two reasons why I say that. Our basswood is getting less all the time ; the trees are being cut down, and I am getting less basswood honey every year. I think that possibly by the time we got them educated up to take baswood honey in any quantity, we would have none for them, and so I believe it is best to stick to the clover honey. I honestly believe that there is a good market. You may have to take six cents net sometimes in England, but if you get nine cents three years after you have taken the six, you can average it up. I have got more than nine, and I do not think I ever got as low as six. If you are going to stay in the markets, you have to take the market prices, but that depends on what honey is in other countries that are producing honey in tons. One man buys all the honey I have got. I cannot get two strings to my bow. I tried to reserve ten cases this year for another firm, and they snapped it up, and gave me two shillings more than I expected to get, and that stopped me. I am satisfied to-day if I had twenty-six thousand pounds of clover honey in sixty-pound tins I could get 2 1-2 shillings a hundred more than I got for my last shipment.

The President : The ways and means of getting it there is our most vital subject. Could not Mr. Fixter inform us on this question ?

Mr. Fixter : I have not thought of it at all. I do not think our friends had much trouble in getting rid of their honey in our district this year. I believe, as Mr. Dickenson says, that if we produce a good article we know of no difficulty in getting rid of all the honey in the English market that can be produced in this country. All we have to do is to put it up right.

Mr. Holtermann : I believe the subject under discussion is that of the Honey Exchange. I believe that Committee has probably done good work in this matter of the grading rules. The thought has been suggested as to the necessity of having money to do something with. I have no doubt of that, and did not have from the very first, and when it was first spoken of I never dreamed that there was any other thought than that there should be a stock company formed—a chartered and limited company, which should act in that direction, and get stock as far as they could. I doubt very much if $50,000 could be secured for that purpose. I do not know that it would be necessary to have that much. In this direction of trying to, as it were, fix a price and control the output. I doubt if any organization in this country will ever succeed. When we go to California, or take the Citrus Fruit Exchange, where the areas for producing lemons, oranges and so on are limited, and where they are as a rule long distances from the market, it is an easier matter to control outputs and fix prices. Now, the question for each of us is—and no man who is producing a large quantity of honey can afford to trifle with that question—our own output this year has been nearly 30,000 pounds, and I have no doubt there are many in this room who have produced as much, too ; we cannot afford to fight one another ; we cannot afford to do that which is not honestly right in this matter, and if we are trying to work in a direction which is wrong, we are wasting our energies. We should look at all these questions in a common-sense way. Let us look at the directions in which the dairymen have worked. The dairymen have not attempted to take hold of this question from that standpoint ; they have not tried to fix the price of butter and cheese and make people pay that price. We have had some of our best men in the Dominion given to these lines, and among them I do not hesitate to say is Prof. Robertson. What directions have they worked in, and can we get our lessons from them? The directions in which they have worked is this. They have aimed at organization; they have aimed at better methods of producing; they have tried to get a more equitable and better article upon the market; and as thy increased the quality of that product, they had a greater market at home, and they were able to get into the foreign market to better advantage. I do not hesitate to say that that is the direction in which we must work. That is the right direction.

Just let us see what the Government has done in the question of fruit. They have helped in spreading the thing, in giving out better qualities, in producing a better article, in giving cold storage, and more rapid transportation. In the beef line, and so on, they have helped in cold storage, and are helping it in directions along that line, and I am sure if we would do what would be in our best interests we would unite and ask that more be done in that direction. What we are after is not so much to produce more beekeepers, although that will look after itself, but we want to reach beekeepers more widely by better organization, and get them to produce better articles. I was in Ottawa quite recently, and I happen to know that Mr. F. W. Hodson considers as Live Stock Commissioner, that bees are live stock, and that live stock comes properly under his department, and a shipment of honey has gone to England to see what can be done there, and he is anxious, if we will organize and get into business-like methods, to get in touch with this Association, and to help us to develop our foreign market.

What Mr. Dickenson has said is quite correct—that basswood honey will not do in the English market, and only the best articles should be sent over there, and we should be cautious that every Tom, Dick, and Harry does not send there all kinds and qualities; if they do that at the very beginning, the honey will get a reputation which we should be anxious to avoid.

Mr. Dickenson: I cannot agree exactly with what Mr. Holtermann says about going to the Government for everything. I think we should do something for ourselves. I do not see what the Government can do for beekeepers, as far as selling honey in England is concerned; we have that already established. Clover honey is what is wanted there. We can get four or five shillings a hundred more than the California people can get. What more do we want than to find out men who can handle it, and buy it, and get it there?

Mr. Holtermann: I would like to ask Mr. Dickenson how can he prevent this situation? We know that there are all kinds of clover honey on the market, and a great deal of very inferior honey. As soon as it is sounded out that honey can be sent to England, how is he going to prevent this poor honey being shipped? There is our trouble. The fruit men do not hesitate to ask for Government help; the dairymen do not hesitate to ask; but we cannot get our heads together enough to ask that they should help us, and yet we are paying taxes to help the fruit men and others.

Mr. Dickenson: I think Mr. Holtermann does not take broad enough view in connection with this industry. You must not put this beekeeping industry in the same class as cattle, sheep, poultry, and hogs. Farmers feed their cattle, and they feed their hogs, and they produce them for the English market. Our bees roam the fields, and they get from their neighbors. There is our surplus honey. Eight or ten farmers with as many bees as I have could cover the ground in my township. What are we going to do with the other fellows? Are we going to get up and advise them to go into that industry, and say it is in a class with the men who raise and fatten cattle and hogs? The Government will not take hold of it in the same way that they will with poultry. That is the way I feel in the matter.

Mr. Lott: I think it is a subject worthy of discussion, but I do not think I misunderstand Mr. Holtermann, and I do not think I can agree entirely with him or Mr. Dickenson. But what I think Mr. Holtermann is leading up to is this, honey that is put upon the English market should have some method or system of handling and inspection before being sent there. Our apples that are sent there are branded Canadian, and they are marked according to the quality. I presume that is what Mr. Holtermann means, that all classes or grades of honey should not be shipped to the English market. I think either it should be under the supervision of someone appointed by this Association, or an inspector under the Government. I see no reason why the Government could not assist us, when they are sending their experts along other lines for other commodities. Our butter has to undergo a certain inspection ; our cheese has to undergo a certain inspection, and our fruit, and I see no reason why honey should not come under the same heading. I think my friend Dickenson will agree with me if you send an inferior class of honey to the English market it would have the same effect as a bad firkin of butter.

Mr. Dickenson : I do not claim that linden honey is inferior honey by any means, but it is not the flavor the English people like.

Mr. Lott : Possibly not. I am not disputing you on that ; but take people who have not the time to devote to it, and will let their honey run together, and extract it and put it upon the market. What would be the result if that honey should go to the English market ?

Mr. Byer : I think we should lay special emphasis upon the point Mr. Lott has brought out with regard to having inspection. Mr. Dickenson sends his honey to England every year, and he is meeting with figures that are remunerative, and I feel quite sure that if every Tom, Dick, and Harry would send their honey indiscriminately he would soon lose the market he has there. Take the apple market, and it has been one of the best things for even the undershippers that they should have Government supervision. If it was withdrawn, our apple market would be ruined in a few years. We want not necessarily Government supervision, but some form of inspection. The York County beekeepers almost to a unit asked me that while I was at Trenton to impress upon the Association the urgent need of trying to establish foreign markets. One very difficult point to solve is to know where to send it to. Mr. Dickenson is very fortunate ; he knows a firm that is reliable. If I had 50,000 pounds to ship to England I would not be able to ship it because I would not know where to send it. There is a risk before we get there, and it gets in the hands of an unreliable firm, which would soon spoil our taste for sending it there.

Mr. Holtermann : I do not see how, unless the Government gets hold of matters, and gives an Act in the direction of inspection, we can do anything. This Association is a Provincial Association, and if it passed a resolution that there should be a certain grading of honey in this Province, what would it be worth ? Nothing at all. The only way is to have a Dominion Act. I am not above receiving Government aid in these directions, and, if we are going to change the present conditions of having honey thrown into large centres and brought down to the price that it is, it will never be done unless we have some different mode of working than at present. What we want to do. and the men who are in the Government can do it better than we can, is to equalize the circulation, and not let that honey be thrown into the large centres such as Toronto and Montreal, which has the effect of ruining the market in other sections. We should not be above receiving the same aid other associations are receiving.

Mr. Dickenson : I think information could be got from the head of the Canadian department in England with regard to reliable commission men, and I do not see why there could not be honey sent through those commission men.

Mr. Brown : It appears to me that a few years ago at the convention held in the city of Toronto, Prof. Robertson offered to procure a market for the members of this Association any time they called upon him.

Mr. Holtermann : When a dry goods man sends a commercial traveller to sell his goods, he does not send a grocer or hardware man. He has too much sense fo that. If you want to sell honey, the man to send is one who knows all the inns and outs of honey, and he can show wherein the Canadian honey is superior to something else, or this man's honey superior to another man's. If we are content to work on the principle to send a grocer out to sell dry goods, we will be content with having men who do not know how to handle honey, do not know how to judge it, and do not know how to talk it. As far as I am concerned, I want to say quite candidly I would never be satisfied with that condition.

Mr. McEvoy: I got four shillings a hundred more than any other honey that entered the British market this year. Mr. Dickenson knows that 36,000 pounds more was asked, provided it was equal. I could not touch it in Ontario, because I was not sure I could get an article that would fill the bill.

Mr. Eyer: That is why it needs Government supervision.

Mr McEvoy: The British are very particular. One bad shipment would cut them off forever. I think the beekeepers will have to be more particular what honey they give to the English people. There are no judges in the world as good as the British. They get honey from Australia, the West India Islands, and California, and the different grades from here, but the people are not careful enough. If you sent choice honey, the British will pay for it. There is no use in sending a commissioner from here to get it inspected. I have more confidence in the beekeepers getting out the right article and furnishing it, and it will sell up and down according to the market.

Mr. Holtermann: I would like to ask Mr. McEvoy how he explains this. He sent this honey over, and now he cannot get any more like it.

Mr. Dickenson: Because he had the best.

Mr. Fixter: Mr. Dickenson can explain that from the way he manages his apiary.

Mr. Dickenson: I do not take any more than ordinary pains to have ripe honey. I work on a method that seems very simple. I always take my extracted honey from the third story, counting the brood story as one, the next two, and then I take it from the top. I agreed with Mr. McIntyre, of California, when I read his paper, that two-thirds or one-half capped is all that is necessary if that principle is adopted. But do not extract honey from combs that the bees have had access to to put in the present day's gather, where you can shake some of it out like water. We do not want that in the extractor at all. The honey that comes from the clover has the aroma that is necessary for the English market. There is no secret about getting good, ripe honey. I follow that principle. I am not particular about having every cell capped if I work on that principle, but I want every cell capped if I take it from the second story, because I know there is no room for the present day's gather. It is a matter of a man establishing his own brand of honey. I put my name on every crate, and when I send a letter to McEvoy saying, "I have not got any more; can you fill the order?" he cannot put my name on his crate. He has got to put his name on his own tins. His honey has to stand on its own bottom, and so has mine, and we will soon weed him out if he cannot produce the article. If you once produce a poor article, you will simply cut the price in two, and you know that will never do in the English market. But every beekeeper knows that ripe clover honey will take there; there is no risk about it.

Mr. Gemmell: Mr. McEvoy put his name on and got four shillings more than you got. How do you make that out?

Mr. Dickenson: That bears out my argument in the first place, when I said the markets fluctuate.

Mr. Darling: I just thought a few moments ago, when Mr. Holtermann and a few others were talking, of the very thing Mr. Dickenson has spoken of now. Every man had a monopoly of his name, and I have found out in the small transactions I have been in that if a man is good, and the article is as good as his name, he does not need to care whether other people have a monopoly of the market or not; they cannot steal his name.

Mr. Holtermann: It certainly is a very strange business principle to say that the price of your goods on the market is not affected by other goods. You have a monopoly on your name, but you are selling honey. You have no monopoly on that name; and when there is a great deal of inferior honey sold at a lower price, you rest assured that it will influence the price of a better article as well. All we have to do is to look at the newspapers from day to day, and watch the apple market in Britain, and we know as a rule when there is a great deal of inferior stock sent it depreciates the price all through, and it will do the same with honey.

Mr. Morrison : I think the difference between the speakers has been with reference to whether honey should be graded at all for the British market. I know one man this year who had two tons of honey, and a super of a Langstroth hive held all the cappings he had from that lot. If that man were to ship that honey to the British market, what are the British going to think of Canadian honey? I was glad when I heard this Exchange Committee had laid down the rules for grading. The Government of our country is looking after the trade of our country ; they frame our tariff laws. The Government of every civilized country to-day is looking after its commerce, and finding where its people can exchange their goods, and build up their market. Are we going to use our Government or are we not ? We are willing to take Government grants to our Association. Why are we not willing to let them go on and seek out a market for us ? I think that is what our Government exists for, for the benefit and welfare of the country. We have Lord Strathcona there. He can find out at once, where there is a demand made, for the benefit of this country ; he can find commission men who are safe to ship to, and if our Government says we can will appoint a man like Mr. McEvoy or Mr. Dickenson to inspect all that honey, and say it must be up to that standard, we will get a market that other countries cannot compete with, and we will get the extra four shillings on it. That is what we are after, and we cannot get it without a higher grading.

Mr. McEvoy : The statement has been made that a large quantity of honey thrown on the British market might affect our price there. It has no effect whatever on choice honey. The British will buy it. It will affect the inferior, but not the higher grades.

Mr. Dickenson : I cannot fill the order for one man.

The President : I would like to ask how our Honey Exchange Committee is profiting by this discussion. They would like some help and some recommendations as to what to do if they are to go on. It is that information they wish. What are we next to do ?

Mr. Hall : I shipped on three occasions some honey to a British firm in London. They wrote me about the month of March, and wanted 5,000 pounds of honey. They did not say whether they would take my basswood honey as well as my clover honey. I was foolish enough to accept the contract at eight cents a pound, and instead of 5,000 pounds to send them I did not have five ounces, and I had to buy some honey for them, and I sent them and told them the fact. As I sent them only 3,000 pounds, they cancelled the other 2,000 pounds, and I have never been able to place honey with them since.

Mr. Dickenson : That did not injure my market or my name.

Mr. Hall : Not a bit ; it has held up your market. If you did not send them a good thing they would not have anything to do with any of you in the future.

Mr. Fixter : How would it do to amalgamate with the Fruit Exchange, or send the honey to them ? Have the present Committee thought over that ? We have two exchanges in Ottawa that handle a good deal of fruit from this country.

Mr. Gemmell : Will they sell our honey first, and their fruit afterwards ?

Mr. Pettit : I think it would be interesting to the meeting if Mr. Fixter would tell us something about the working of the Fruit Exchange.

Mr. Fixter : I think they sell on a percentage. You have to get men who are reliable at the other end to do business.

Mr. Darling : I have never had anything to do with that Exchange beyond being a spectator there in business hours. I have seen them selling maple syrup. I have never shipped, so I do not know on what conditions they sell, but it is sold by auction. The man who manages the Exchange is the auctioneer. He will have his fruit or syrup arranged where it can be seen. He says, in the first place, that nobody but those who are in the business can buy. Then the fruit is put up, oranges, lemons, or our western fruit, whatever chances to be on just then, and he says, "I have so many cases, how much will you bid?" He will wait for perhaps two or three bids, and maybe he will only get one. If it is a bid he will accept he says, "How many cases will you take?" And he says, "Do any more want any at that price?" Or if the price is a little too low, he says, "We will not sell any more at that price." The man who ships there takes what he can get, less whatever he is charged for the transaction.

Mr. Lowey: They are simply commission men. I have nothing to say for or against it, but I would not advise it. I think the proper line is to get a man acquainted with honey who understands something, to take it and sell it and see it is properly stored and so on. I know of honey that has been sold in England at thirty-five cents a section. I am satisfied that there is a good market in the old country and in this country.

Mr. Mason: Mr. Holtermann is on the right track as a business man, and I do not see why the Government should not aid us as well as the pork men. The product of the bee is equal to the product of the hog or anything else, and if the Government has to step in and see we do not pollute the British market with poor apples or pork, they have the same right to step in and see we do not give the people of Britain a wrong impression with regard to honey. All we have to do is to appoint a responsible and capable man in Montreal to receive our honey who can judge this honey, and if it is not proper return it at the sender's expense, and he will not repeat it. Then have a responsible person at the other end to dispose of the honey. We do not want any $50,000 capital; we can all lay out of our money a few weeks and the man at Montreal can send back what every man is entitled to. I do not think you would have the least trouble in handling 20.000 pounds in this way, and in a short time every beekeeper would know exactly what kind of honey to send. I thought when I heard of this exchange that is just the way they were going to do.

The President: We would need to be incorporated to do anything like Mr. Mason says, and we would need to have more money than we had last year to do that. It will cost about $130 for incorporation papers.

Mr. Pettit: As to what your Honey Exchange Committee is to do for us next year, I would suggest in the meantime, until we decide to form a stock company or do something like that, that they go on as they have been doing, collecting statistics in the spring of the number of colonies that have come through the winter and the condition they are in, and at different times during the summer as to the prospects and the honey that is coming in, and get these reports to the members as quickly as can be done and what the prices will probably be. I think this is all the committee can do at present. It will be well worth the membership fee to have the reports.

Mr. Holtermann: I understand there were sixty-two members of that honey exchange last year that paid $1 membership fee. If what is to be done is simply to gather those statistics and send those reports out, why not use the Ontario Beekeepers' Association to do that?

Mr. Sibbald moved, seconded by Mr. Byer, "That the Ontario Beekeepers' Association appoint a Committee to collect crop reports and distribute the same to the members; also to approach the Department of Agriculture at Ottawa with a view to establishing a market in England with power to arrange a system of grading and inspection under special Act of Parliament."

The President put the motion which, a vote having been taken, was declared carried.

Mr. Byer: I believe this Committee did everything they could, and did a lot of hard work, especially Mr. Couse, and he has received no remuneration whatever, and while I will not put it in the form of a resolution, I would suggest that he receive the balance that is left over. However, I take pleasure in moving that a hearty vote of thanks be tendered our Committee for this last year for the work they have done.

Mr. Pettit: I have great pleasure in seconding the motion.

The President put the motion, which, on a vote having been taken, was declared carried.

Mr Gemmell: I would move, seconded by Mr. Hall, "That the old Committee act again in the same capacity," and they will get another vote of thanks next year. (Laughter.)

The President put the motion which, on a vote having been taken, was declared carried.

Mr. Fixter: Is the Committee to gather statistics for Ontario or for the whole Dominion? Would it not be well to have the statistics for the whole Dominion?

Mr. Lott: As I understand that resolution, it is of a Dominion character. We are to approach the Dominion Parliament through that Committee to ask for special legislation in the interests of the beekeepers, and I would think it would be quite necessary for them to go outside of the boundary of Ontario. I look upon it as a Dominion matter from that standpoint, and I think the statistics that are gathered should be from the Dominion of Canada or from the Beekeepers' Associations in Quebec and other parts of the different Provinces.

Mr. McEvoy: This Committee after all did a lot of good in the Province of Ontario. They set the price at 7 1-2 cents, and it did a great deal of good all over.

Mr. Newton: I had a letter from Mr. Frith, the Secretary of the Oxford Beekeepers' Association, who has moved away, and he had been following our work during the season, and he expressed himself as pleased with the work of the Exchange during the past year. In a word, he said, "You are in the right direction. I hope you do not drop it, but continue in the work even though it is up hill." I know in the country out here there is lots of room, and if you were organized you could place the biggest part of the product of Ontario in Manitoba.

Mr. Pettit: I have been informed that Winnipeg is fearfully crowded with honey.

Mr. Newton: It is just like Toronto. If we throw it all into Toronto there is going to be a glut; we have to distribute it.

Mr. Chisholm: I shipped one barrel of honey to Winnipeg f.o.b. here on the 14th of last October; the man's offering was eight cents

Mr. Newton: I shipped some last week at eight cents.

Mr. Hall: I would suggest that that balance of money stay with the Committee; they can use it.

Mr. Lott: It is moved by myself, seconded by Mr. Post, that a committee be appointed to revise the by-laws of the Ontario Beekeepers' Association in conformity with the Agriculture and Arts' Act, said Committee to report at the morning's session, and to consist of the mover, seconder, the President and Secretary, and Messrs. Sparling, Holtermann, and Armstrong.

After some discussions as to whether this resolution should not be introduced under the head of new business at another time, the President put the motion, which, on a vote having been taken, was declared carried.

QUESTION DRAWER.

Q.: What size of hive do you prefer?

Mr. Post: I use a nine-frame Langstroth hive. For extracting honey if I make any change I would add more frames and use a larger hive.

Q.: How can old covers be repaired that are chocked and leak? Would it do to cover them with tin and paint them?

Mr. Post: I should say if there were many very large checks in them, to cover them with tin and paint them.

Q.: In moving bees what is the proper way to close the entrance to hive and allow sufficient ventilation?

Mr. Post: I think the better way is to screen the tops and bottoms of the hives and cover the entrance with a tight piece of material of any kind. That is the way I do.

Mr. Holtermann: I am very sorry that Mr. Post is so very far behind the times. The proper way to do is to have a portico on the front of the hive, 2 1-2 inches deep with sides projecting a trifle beyond the board that goes across the top and grooved to receive a screen which will slide down and close the front. The day we want to move our bees we take the screens and slide them down nearly all the way, tipping them a little sideways so they do not go clear down and close the entrance. Just as quickly in the evening as the bees quit flying and sometimes before then, we just go around and drop those screens. By having that portico the bees can come out in front of the hive, and they do not feel confined to the same extent. If you put a wire screen against the entrance the bees worry to get out, choke the entrance and smother.

Mr. Post: Do you have any other ventilation?

Mr. Holtermann: None whatever, and in the very hottest days they will not smother.

Q.. Do you find bee-escapes a success?

Mr Post: I do in taking section honey, but not for extracted honey.

Q. What is the most effective way of preventing increase of colonies in out-apiaries for extracting honey?

Mr. Post: I give plenty of surplus room, and screen the bottoms of the hives, and have no honey boards on them. I very seldom get swarms, and that is the way I manage some of my bees. Some have two tops on, and some have three, while others have only one. There is a screen made the exact size of the bottom of the hive out of inch stuff, and the wire cloth is nailed on top of the screen, and that is held in place by Van Dusen clamps, one on each side, and we close the entrance up and load them in carload lots. There is a screen above and one below, and we never have any bees perish, and that, in the month of August. We do not run a bottom board on the hive all through the honey season; just a wire cloth screen.

Mr. Dickenson: That depends on what locality you are in. I would not recommend screens in some localities. I tried screens two years ago, very much impressed with Mr. Post's idea of preventing swarming, and the very first five colonies that came off all had screens on.

Mr. Post: They might have had the swarming impulse before you put them on.

Mr. Pettit: In having swarms on the bottom board with the screen, we had difficulty in getting them to stay in the hive. If ordinary bottom boards were used for a few days, then screens substituted, they would swarm out. Having shook swarms on them they would stay out.

Mr. Hall: I am the one who asked that question. The reason I asked is because I know Mr. Post is a very superior bee-keeper. I know he succeeds by screening the bottom. It is a grand institution for moving bees, but in our section of the country that screen at the bottom does not succeed in preventing swarms, it only retards them; I do not know but that they may gather some more honey.

Mr. Gemmell: I endorse you exactly. The locality makes a difference.

Q.: What shall I hive my swarms on? Starters three-quarters of an inch wide, full sheets of foundation or drawn combs?

Mr. Post: For comb honey, I believe it is a good thing, and that you will get more honey, to hive them on starters three-quarters of an inch wide; but for extracted honey I would take full sheets of foundation or drawn comb.

Mr. Pettit: I tried hiving just a little on drawn combs this last summer, and my experience has been preparations for swarming in just three weeks from the time the swarm was hived on drawn comb; that was for extracted honey.

Mr. Sibbald: My experience in that is something the same as Mr. Pettit's. I would like to ask Mr. Post his reason.

Mr. Post: For extracted honey I would want full combs below; either frames or foundations or drawn combs. You cannot get them to build combs to advantage if they can store honey above in empty combs.

Mr. Sibbald: What is the object?

Mr. Post : I want to get the honey above. In my way of thinking you cannot get combs sufficiently strong for bees in naturally built combs.

Mr. Holtermann : Why not let them build natural combs on wire? It works all right

Mr. Post : We have never tried that.

Mr. Sibbald : Mr. Post wants his bees in good shape for buckwheat, and he wants some combs to breed on. There is no doubt he is right in that.

Mr. Armstrong : What has Mr. Post on the top?

Mr. Post : I would put a queen-excluder on and put on full drawn comb and either foundation or full drawn combs below. I would not put them on starters.

Mr. Sibbald : Would you if you were in a locality where there was no buckwheat or fall flow?

Mr. Post : I do not know. I would have to think a while.

Mr. Fixter : I think it would be more important in that case to have full drawn combs.

Mr Dickenson : It depends whether you are working to increase or to keep down increase.

Mr. McEvoy : I would use full combs in every case.

Mr. Morrison : Why should a man leave his full combs lying there and buy foundation?

Mr. Post : I do not think he should do it.

Mr. Holtermann : I do not like the idea of using starters below and full combs above. I do not like the idea of using sheets of foundation below and full combs above. If I wanted to use full combs above I believe I would use full combs below, if I had them, and if that would not do, then I would make them go as far as they would, and I would use foundation below and foundation above when they swarm, because if you have a right and proper swarm and the honey flow on they will draw out all the foundation in a twelve-frame Langstroth hive in the brood chamber in forty-eight hours, anyway.

Mr. Post : You want a queen-excluder on.

Mr. Holtermann : Yes.

Mr. Mason : When you put in a new swarm do you put on the super at the same time or a few days after?

Mr. Post : If the honey is coming in good, put it on at the start.

Mr. Lowey : I usually hive the swarms, and I place them with the supers on before the bees are hived, with all drawn combs if I have them, not with all sheets of foundation, but, of course, I contract. I put four combs with three swarms.

Mr. Edmonson : I have had hives swarm on full sheets of foundation with combs above, and I have got sealed honey with not an ounce below, with the foundation not being touched.

Mr. Dickenson : I think that difficulty can be overcome in this way, to put one comb in the centre of the brood nest and the rest foundation. Don't be in too big a hurry putting on the top story.

Mr. Pettit : I would like to find a little fault with Mr. Dickenson just now. He has brought out a point I have in a paper to read to-morrow morning, and it is a very good point. I think it is too bad Mr. Dickenson stole it from me, that is this one comb.

Mr. McEvoy : In putting that in the bees have got a chance to store the pollen.

Mr. Dickenson : That is just my difficulty.

Speaking on relative merits of large and small brood chambers, Mr. Post said that if you got an eight-quart swarm from an eight-frame hive then you would get a twelve-quart swarm from a twelve-frame hive.

Mr. Holtermann had used both large and small hives, and with good queens he found the former was filled with brood and bees just as well as the latter.

Mr. McEvoy would double up brood chambers and have a sixteen-frame brood chamber, with the twelve-frame he found they soon settled down so that the queen occupies a smaller number and the balance were filled with honey. He preferred two eight-frame brood chambers.

Mr. Post said they would desert the lower.

Mr. McEvoy was willing to go to the trouble of putting the queen below every few weeks.

Messrs. Dickenson and Shaver said they could beat Holtermann producing honey, they using a nine-frame and the twelve-frame.

Mr. J. B. Hall preferred the eleven-frame.

Mr. Holtermann: It does not do to compare average results between a man with 400 stocks and one with 60. But with the twelve-frame hive some last summer filled four twelve-frame supers full of light honey, Langstroth frames.

C. W. Post: You can easily reduce the size of a large hive, but you cannot enlarge a small one.

Q.: Would you prefer for extracting super frames six inches in depth, or the full depth Langstroth?

Mr. Post: I would take full depth Langstroth for any frame that is interchangeable with the brood nest.

Q.: Would it be profitable to bring bees from out-apiaries, and put all in one cellar, and then in spring put them all out in one yard till just before the honey flow, after which they are put into their respective out-yards?

Mr. Post: Yes, it would be all right.

FORCED OR SHAKEN SWARMS.

By Morley Pettit, Belmont.

The key-not of modern business is specialization and expansion. The highest success can only be attained by concentration of effort on a single line. To beekeepers this means cutting out all side lines and keeping more bees. Not only that, but they must be kept with the least expense possible of both time and money. To do this one must have large ideas, establish out-apiaries and adopt methods quite different from those employed in a single yard.

The first and greatest problem in connection with out-apiaries is that of controlling the desire more or less developed in all bees to swarm. Where one is devoting his whole time to a single yard it is comparatively simple to allow this impulse to take its nature course; but while swarms are issuing and being hived at home, the thought would be unpleasant, to say the least, that swarms were issuing without being hived at several yards away from home.

A great many plans for the control or prevention of swarming have been proposed and adopted with varied success, but the one particularly under consideration is known as "forced," "brushed," or "shaken swarming." It was first brought before the public in a time and manner to attract general attention by L. Stachelhausen in "Gleanings in Bee Culture," Nov. 1, 1900. True, this method had been practised and described to a limited extent for over one hundred years; but not until this recent date when the general establishment of out-apiaries had awakened the sense of need did the idea become popular. During the three years which have followed Mr. Stachelhausen's first article, the matter which has been printed on this one subject would fill volumes. It has ben tried and rejected, or adopted with variations, by thousands of apiarists. Upon the whole, it has proved most generally successful.

It is the purpose of this paper to describe briefly "forced swarming" as practised by myself with a large measure of success during the past season. By it natural swarming is almost entirely avoided, and each yard visited only once every seven to ten days.

In the first place every effort is made to retard swarming. Extracting supers are put on all except weak hives during fruit bloom, and a certain amount of evening up of brood—that is, taking from the strong and giving to the weak—is done at the time. When white honey begins coming in freely, the brood is again evened up, and in the stronger hives alternated with empty combs. Comb honey supers are put on or extracting supers enough to contain the full amount of white honey expected per hive. Entrances are enlarged to their fullest extent, about 1 1-4 in. x 17 in., and ventilation is given at the top of the super, so that a current of fresh air will pass freely through the hive Now, if hives can be partly shaded, and the brood chambers are large enough to give full scope to the laying powers of the queen swarming will be greatly retarded. At the next visit all hives are examined for indications of the swarming impulse. If only empty queen cells are found and the brood chamber is nearly full of brood, a card of brood is removed and replaced by foundation ; any cells containing eggs are broken down. The brood removed is used for strengthening weak colonies or forming nuclei.

If any cell contains a queen larva, it is proof that the swarming impulse is far enough advanced to take action. Hives previously prepared for swarms have been distributed about the yard before starting operations. They each contain in the order named, two dummies, three starters, one worker comb, three starters, and three dummies—twelve in all in a hive of ten-frame Langstroth capacity. One of these is brought and set down on bottom board, and stands behind the hive to be treated. The operator, who sits at the left of the hive, removes the three dummies from the right or farther side of the new hive and shoves over the remaining contents so as to have the empty space next him. He now lifts the comb nearest him from the brood chamber, shakes it almost free of bees, and places it in the new hive next the left wall. The next comb has a double space for shaking off bees in the old hive. It takes its place beside the first comb and the return motion of the hands carries a dummy from the new hive to the old. Comb No. 3 is shaken, carried to the new hive, and dummy No. 2 is brought back. The fourth comb exchanges place with the first starter, and so on. When the twelfth comb has been shaken in its own hive and transferred to the new, the sixth starter put in its place and the old hive filled out with the three remaining dummies, we put on the supers, close the hive, and the bees have been swarmed.

There is now a swarm hived on starters on the old stand under conditions fairly natural at the convenience of the beekeeper, without fuss, excitement or acrobatic feats. Leaving them in the old hive is merely a matter of convenience. Unless there is no honey in the supers it is not necessary to wait for the bees to fill themselves with honey before shaking, as they can do that at leisure afterwards. These swarms behave in all respects like natural swarms just hived. If they swarm out next day, so would natural swarms. under like conditions, and the same little devices must be used to make them contented. For example, in comb honey production it may be best to hive on a full set of starters (not omitting the comb) for a few days, then contract with dummies. Shade should be given, etc., etc., and always ample ventilation. The empty comb in the middle is useful for various things. If the supers contain sections it catches pollen which might otherwise go up; if extracting combs it keeps the bees from all going up into the supers and deserting the queen.

In extracted honey production it may be best to shake on a set of full sheets of wired foundation. I propose to test this matter fully next season.

A few minutes after shaking, swarms sometimes show signs of queenlessness. The queen has been accidentally left with the brood, or in rare cases, has been lost. In this case we do not bother hunting the queen, because she will do no harm with the brood, and if lost she cannot be found. In fact, we hunt queens, except in rare cases, but once a year, viz., at the clipping season. Give this queenless swarm a young queen, a ripe cell or a card of open brood and eggs. If the latter is given, all but the best cell must be destroyed at next visit

The "parent stock," as we may call the hive of brood, sits directly behind the swarm and has enough bees to care for the brood and the best queen cells which have been saved unshaken. It is given an extracting super at once, and is removed to a new stand at the next weekly visit. To save time these parent stocks might be given laying queens, or on the other hand the brood might be shaken clear of bees and used for building up weak colonies and nuclei.

For comb honey production I know of only one better system than that just described. That is to allow the bees to swarm naturally. No stocks work in sections with the same vigor as natural swarms. This system is the nearest approach to natural swarming and is, all considered, enough cheaper to make it more profitable. In producing extracted honey, I think that the twelve-frame Langstroth brood chamber and super capacity of twenty-four frames with one large entrance and upward ventilation from June first on, will reduce swarming to a minimum, which may be almost entirely disregarded. I hope to be able to report more fully on this subject next year.

On examining later stocks which had been shaken on starters without any comb, I found in some cases the queen gone. She had been worried to death by the bees, who could not see why she did not go up into the super with the rest of them.

Mr. Sibbald: I must compliment Mr. Pettit on his paper, for I consider that it was a splendid one. It was not written without experience. I hoped that he might differ a good deal from me so that I could get at him, and I was trying to find out some place to get at him—some weak point—but in that I was a little disappointed. I feel that that paper hardly needs any discussion only to be endorsed, but since I have a place on the program and platform I may as well go over the points again. In the first place he mentions "labor." Labor is the greatest factor in bee-keeping. The amount of money it costs to buy an apiary does not amount to very much compared with the money you can make out of it, but labor is the big thing, and in that he was right. Anything that will help us to manage our bees with less labor, and enable us to keep more bees, will help us to make more money, and that is what the most of us are after, although some may like to keep bees for fun.

Then he mentioned the swarming. That is the greatest difficulty—to keep a lot of bees without having some one to watch the apiaries. He also mentioned a lot of good things to retard and prevent swarming as much as possible, and among those things he mentioned equalizing. Equalizing the brood is necessary for more than that, so as to have your stock all in the same condition, so that one manipulation is sufficient for almost every hive. In one day you can do the whole work of the yard. If they are uneven, you have to come back in a day or so and do something else; supering early and the proper ventilation has to be given by propping up the bottom. Mr. Frost has a screen underneath, but in my experience propping up both the back and front lets a current of air through, and I think the bees are rather better satisfied with the board bottom than with the screen. Mr. Pettit mentioned one thing that I do not agree with him in. He said he wanted a large hive to give the queen every chance to lay. It is my opinion, and I am not sure that I am borne out by any particular authority, that a queen can be overdone; and when a queen is overdone and fails to fill the cell with eggs the swarming fever has commenced in the hive. The pollen is put into the cells, and it is quite possible to overdo a queen, and I think it is better to have a smaller hive, contract her, as it were, and let her fill every cell up with brood, and fill right up to the corners, not have any honey down below, and when you put on your top story the division between the brood and the honey is just the excluder. Once you get them into the super by lifting that super soon enough and putting another under you have robbed them again of the honey. That is likely to retard the swarming. That cannot be done in my opinion with a twelve-frame hive. If it is fruit bloom honey it will be carried up and spoil your other honey. If you have a lot of honey it would be better to have your supers on and extract them out before your white honey comes in. You have the honey in the honey house and you can feed it back in the fall if you want to.

He has too much truck altogether in the brood nest for me. Five dummies for every hive! If he had one hundred hives he would have five hundred dummies, and it would take a waggon to carry them. If he had three apiaries see what an amount of lumber he would have, and it is so expensive. I do not see any need for the dummies at all; if you hive your swarms on starters they will go right up to the top story and cluster along the starters and draw down the centre ones a little. If they have lots of work above they will not build those combs down at all in that season. If you want buckwheat honey in the latter part of the season that would not apply. It would be better to have a good brood chamber and lots of brood to raise bees for what you want them for later on. The outside ones where he puts his dummies will hardly ever be started on at all, if you work the top stories or sections right. I do not see any advantage at all in the dummies. Then as to one full comb, I do not believe in that at all. If I use a comb for the purpose of keeping the pollen down there, I would cut two-thirds of it out, and just leave about an inch or two inches at the top, and let them put the pollen in there and keep them clustered up instead of clustered down. Of course, I think a second shake is necessary to prevent after-swarming and to get the full force of the bees into the hive you are taking your honey off, about a week after.

Mr. Pettit: I practiced leaving the parent stock behind the swarm for a week, and then moving it to a new stand.

Mr. Sibbald: Where do those bees come back to that you fool when you take the old hive again?

Mr. Pettit: They fool around a while and then come around to the front.

Mr. Sibbald: I do not like that fooling around. In my opinion they generally get cross, and if you are walking through the yard they will let you know. You can remove a hive, and a certain number of bees will come back to the old stand. You do not get enough of them; too many of them go with the hive and mark the new location. In an out-yard, if you have a second swarm and a first one comes off at the same time, you are likely to lose the first and best swarm you have got. You do not want to take any chances in an out-yard where you have nobody to watch them. I believe it pays to take the second shake, and then you can carry your brood right away.

Mr. Pettit: This preventing of after-swarming by moving in five or six days is by no means new. We have tried it with success in natural swarming, and prevented a large percentage of after-swarming. In a first and natural swarming there are a great many more bees left than with your shaken swarm. An empty extracting super must be put on the parent hive as soon as it is shaken, and it needs a good large entrance.

Mr. Sibbald: Do you mean the brood you have already shaken all the bees out of?

Mr. Pettit: Yes.

Mr. Sibbald: I would not agree with that. I do not want to have to look after that hive.

Mr. Pettit: You do not want increase?

Mr. Sibbald: If I increase, it is by nuclei.

Mr. Pettit: If you intend to have nuclei break up your parent stock at once.

The President: Why put the extracting combs on the brood?

Mr. Pettit: It prevents this after-swarming.

The President: Will they not have enough cells empty from hatching bees?

Mr. Pettit: A brood chamber full of brood is a pretty hot place in a hot day, and unless you give them lots of air, extra store room and plenty of ventilation, the chances are they will not tear down queen cells and they will go on with the after-swarming.

Mr. Sibbald: I would not like to take chances if I was not going to be there. After the second shake I take the brood that is left, and if it has been on the left of the hive I put it to the right of the hive, and I leave it there; and if I have a good, young queen I let her go in, or let one hatch if there is a good sell in it. She will mate and the chances are you will have a new young queen, and you will have your old comb, and as soon as the supers are taken off the swarm and the season is over take that brood chamber and put it on top of this swarm and unite the two.

Mr McEvoy : What about the queen ?

Mr Sibbald : If you are anxious to destroy the queen you can do it ; if you are not they can settle that question, and a young one will generally be left.

Mr. Pettit : We are back to the question of management again. My hives are in rows, and there is barely room between the hives in the rows for me to stand so I could not set the parent stock aside to the right or left ; all I can do is set it behind. I will admit, perhaps, if your apiary arrangements were such as to allow the parent stock to be set beside the hive it would be better, but my arrangement is not so, so I have to do the next best thing.

Mr. Dickenson : I think it would be better if Mr. Pettit would widen his rows of hives out.

Mr. Hall : With Mr. Sibbald I agree with the ability of that paper, but Mr. Pettit is going to put his bees so that there is room on each side. We always put them on the side, and the second shaking is invaluable, no matter what you want them for. If you put them behind instead of at the side there are a lot of young bees confused ; they get lost and sting and do various other things. You give them an empty comb. Please leave some uncapped brood in it, and your bees are contented. My experience is sometimes they are very discontented ; they will not stay there, and I am not there to look after them, and if they have lost their queen they can rectify the matter ; without that they keep trying to push up.

Mr. Newton : I can endorse Mr. Hall's words as regards the brood. I have practiced putting in a card of unsealed brood instead of an empty comb, and I found the bees were far more contented, and went to work in better shape than on a full set of starters, or if there was an empty comb put in the centre, and in every case I think the comb was as much worker comb as drawn comb.

Mr. Holtermann : I would like to ask Mr. Hall whether he has any trouble by putting in that card of brood from eggs or any tendency to swarm earlier ?

Mr. Hall : Last year out of forty stocks we had only two of the shook swarms that attempted to swarm.

Mr. McEvoy : Sometimes it is the old queen, and they get lost ; but by putting that in they have the material to start a number. They stay better. It is necessary to have that.

Mr. Sibbald : In the first case we have a clipped queen, and she is lost ; what will the bees do ? Perhaps they will join in with the neighboring colony. In the other case you put a frame of brood in and they have there something to raise a queen, and suppose you have got an old, worn-out queen in there and a shook swarm, the first thing you know they will hatch a queen, and they will swarm out, and perhaps take another swarm away.

Mr. Hall : I have lost several queens, and I have been very busy and could not attend to things, and I simply put in the very young brood into that, and they start a queen cell, and fifteen days after that the queen hatches ; but the bees are pretty old, and they have lost the swarming fever, and they stay at home.

Mr. Shaver : Will they always raise just one queen cell ?

Mr. Hall : No, sir ; from two to one hundred.

Mr. Shaver : Then you get your swarm ?

Mr. McEvoy : I can do much better by putting in that frame of brood.

Mr. Pettit : When I first started this shaking of swarms I tried the frame of brood a little. I must admit I did not test it very thoroughly, but the experience I had at first set me against it. I did not go any farther. I found they started queen cells from this young brood and at once swarmed out the next day.

Mr. Hall : In that case your queen cells would be pretty far advanced before you did it.

Mr. Newton : I have tried that this year, and with the same success as last year. I never had a swarm issue from those hives that I left the brood in.

Mr. Dickenson: I think perhaps locality might have something to do with that. I think the danger in a brood locality where the shook swarm is strong is that by putting in the frame of brood it might lead them to swarm.

Mr. Holmes: My experience does not favor the card of brood in the centre of the chamber; it gives them the inclination to swarm.

Mr. Byer: Is there not a good deal in how far the cells were developed before the change took place? With the ripe cells my experience was when I shook them out the bees swarmed out the next day.

Mr. Sibbald: That is a point we have missed, and it is a good one, too. As soon as the queen cells start, and from that on, five days is about the best time to shake.

Mr. Hall: If you go out only once in seven or eight days some of them have got the cells started for six days.

Mr. Sibbald: Shake them as soon as you see the egg. If you shake them you do not need a card of brood to keep them quiet.

Mr. Morrison: The difficulty is overcome when a man shakes if he finds a number of queen cells pretty well advanced, and he has reason to believe the swarming impulse has got pretty strong, he had better not put in a card of brood, but if the egg is only just laid, put in a card of brood sure.

Mr. Holtermann: The way to shake the comb is to give it the second shake quickly after the first. If you know how to shake, you can shake and not use the brush, whether there are Italians on or not.

Mr. Pettit: I had considerable experience in shaking as soon as I found the cells. A little later I found this was not necessary; and when I found nothing further developed than eggs I simply broke down all preparations for cells.

BEEKEEPING EXPERIMENTS AT THE DOMINION EXPERIMENTAL FARM APIARY.

By John Fixter, Experimental Farm, Ottawa.

When our Secretary wrote me asking me to take part in this meeting, I wrote and told him I would be pleased to do anything to forward the interests of bee-keeping. I asked him to allow me take up the question of management of an apiary, and to explain the different appliances that I used, with the object of learning something from our older friends here. I am out much among the farmers, attending Farmers' Institutes, and I never fail to bring up the bee-keepers' side of the question. I attended some twenty meetings last winter in our county, and gave a short talk, and explained, as you see here on the charts, the different appliances, and how to work them, and I had hoped that I would be put on the programme for an evening session, and have those who were interested come and listen. My instructions might not be the same as those of some here, but that was my object,—to try to learn something from them. However, he placed me on the programme to give the results of experiments. I have a few of them here. Most of you are aware we had a very poor season in our district, and we were not able to carry out all the experiments that were planned; but I think the few we have may be of some interest to you.

Experiments to test whether moisture would affect bees in their winter quarters. Four pails of water were arranged on a table in such a way that three colonies of bees would rest on the edges of the pails. The hives were arranged as follows: The wooden covers were removed and a propolis quilt left on each hive; over this a strip of sacking six inches wide was placed, extending from each outside pail, the ends being well down in the water to act as a conductor of moisture. The bottom boards were loosened, and a one-inch block placed under each corner between the bottom board and the brood chamber, to give extra ventilation in the hive. The bees came out in excellent condition: the close proximity to the water did not appear to injure them in any way.

I have the same thing on this year, and hope to test it a little more fully. The object of the experiment was, so many people write to us and say they have a very damp cellar, is it safe to put bees in it? From this experiment I would say that the dampness of the cellar does not matter so much, if they have it well ventilated, so that there is no bad odor. I do not care then if there is a running-stream through it. I know of cellars in this district where there are running streams through them, and wells in them, but they carry out a thorough ventilating system.

Mr. Morrison: Would a running stream not give a perfect ventilation?

Mr. Fixter: It may.

Mr. Holtermann: More than that, a cellar through which a stream runs is not necessarily a damp cellar at all; it may be a dry cellar. The cold water condenses moisture from the warmer air. It also carries out impurities, and is actually a drying, ventilating agent.

Mr. Post: That agrees with my experience of ventilation.

Mr Hall: The moisture makes no difference at all if the ventilation is right.

Mr. Dickenson: Temperature has quite a bit to do with it.

Feeding Bees in Their Winter Quarters

Owing to the past unfavorable season for honey gathering in the Ottawa valley many letters have been received from people who have only a few colonies of bees, stating that when carrying their bees into winter quarters they had discovered there did not seem to be a sufficient store of honey in the hive to carry the bees through the winter. To gain information as to the best method of overcoming this difficulty the following experiment was tried with six strong colonies of bees:

Four frames of sealed honey were taken from each of the six colonies, leaving the clusters on the four remaining frames. The four frames were left in the centre of the hive, with a division board at each side, and some light packing was placed between the division boards and the sides of the hive. The wooden covers were removed, and a large propolis quilt made of heavy canvas placed over the top of each hive. Over the top of the propolis quilt extra packing was placed to keep in the heat, absorb moisture and prevent draughts or upward ventilation. The bottom boards were left on as they came from the bee yard, leaving the entrances wide open.

The experiment was as follows:

1. Two colonies received maple sugar of the best quality.
2. Two colonies received candied honey and sugar.
3. Two colonies received partly filled sections of honey.

Each colony when put on this test weighed 31 pounds, and each was given 5 pounds of its particular food to start with. The experiment lasted from November 18, 1902, to March 22, 1903.

The two colonies fed on maple sugar consumed 11 1-2 pounds each; they were examined every two weeks and water added to the sugar through holes in the tops of the cakes, keeping it soft and moist.

The two colonies fed on partly-filled sections of honey consumed during the same time 14 3-4 pounds each. There was for several reasons considerable waste in this test, and if partly-filled sections could be sold, even at a reduced price, it would be advisable to do so instead of feeding back.

The two colonies that were given candied honey consumed 10 3-4 pounds each. The candied honey was moistened at intervals, which made it easier for the bees to suck up. Candied honey is made as follows: Take good thick clover honey and heat (not boil) it until it becomes very thin, then stir in fine granulated sugar. After stirring in all the sugar the honey will absorb, take it out of the utensil in which it has been mixed, and thoroughly knead it with the hands. The kneading makes it more pliable and soft, so that it absorbs, or, rather, takes up more sugar. The kneading operation with the adding of fine sugar should be continued until the dough is so stiff as to be quite hard to work. It should then be allowed to stand for a day or two, and if at the end of that time it is so soft as to run or to be sticky, a little more sugar should be kneaded in. It should be cut into convenient sized cakes and placed on top of the frames in such a way that the bees can get at it easily.

The colonies in all three tests came through in excellent condition. Any one of the three methods may be safely followed, but I would strongly recommend examining and weighing all bees the first week in September. At that time every colony should have a good laying queen, and should weigh over 50 pounds. In seasons when there is no fall flow of honey, all colonies in Langstroth hives weighing less than 50 pounds in September should be fed up to that weight at least. The best method for getting colonies up to the required weight is, when extracting to save several full, well-sealed combs, then remove some of the light ones out of the hives, and replace them with the heavier, full frames. If no honey is available, feed sugar syrup. This latter plan is rather a tedious one, and great care must be taken not to daub the hives or appliances, as robbing at this season of the year is very easily started and very hard to stop.

Sugar syrup may be made as follows: Use the best grade of granulated sugar, two parts to one of water by weight. The water should first be brought to a boil, then the pan or vessel set back on the stove so that the boiling will not continue, but the water be kept sufficiently hot to dissolve all the sugar.

The sugar should be poured in slowly and thoroughly stirred until all is dissolved. The syrup should then be fed in a lukewarm condition.

I might say that the quantities of food consumed are great. I think there is more consumed by reason of the disturbance caused to the bees by my attending them during the winter. I like to go down and look at them and see what they are doing, like Mr. Hall. I think the consumption of honey or sugar might be lessened if the full amount is put on and they are left alone. The only thing that might be required is the moistening.

Mr. Dickenson: I do not agree with Mr. Fixter about going down and looking at them. I think to give them a good letting alone right in the cellar is more satisfactory.

Mr. Hall: That does not alter the pleasure of the thing at all.

Mr. Fixter: We do not always have expert bee-keepers to deal with, and you know that many will not attend to their bees the same as those who make a business of it; they never look at them from the time they take off the surplus honey until they get frozen up in the winter, and we get letters day after day, asking, "What can we do to get them through the winter?" We carry on these tests to try to see just the best method of overcoming that, but we try if possible to give them the other advice, to look after their colonies earlier in the season.

Mr Sibbald: I suppose the experiment is all right, but I do not think it practicable to feed bees in winter. I think that should be emphasized. Feeding is only a last resort, and a poor resort at that.

Mr. Darling: I think any port in a storm I should not wonder, perhaps, but Mr. Fixter has had fifty letters this fall.

Mr. Holtermann: There is one criticism I wish to offer. I claim these groups are entirely too small for results of value. When you are dealing with living things you are getting on very dangerous ground. You will get as much variation in groups as you will get variations after these conditions mentioned are put down.

Mr. Morrison: Mr. Fixter explained why he suggested winter feeding; it was not for the professional bee-keeper. I think three were enough last year if the moisture was going to kill them. No doubt Mr. Fixter will be quite willing to risk twelve with moisture in his experiments next time.

Mr. Webster: Have you ever tried feeding from the bottom? Get you feed warm and right close to the cluster. It works well.

Sainfoin Clover has again attracted a great deal the attention of beekeepers and farmers who visited the Experimental Farm during the past year. The number of bees [illegible] working on the sainfoin plots, against those working on white clover, alsike and bokhara clovers was quite noticeable in favor of the sainfoin. For fodder and as a fertilizer, it appears to be equal to alfalfa, and its habits and growth are very similar. The sainfoin being slightly finer in the stems, and having more of a stooling habit, will therefore make a much better pasture, especially for sheep.

Soil. The soil best suited for the growth of sainfoin seems to be a deep loam containing a fair proportion of lime, with good, deep, natural drainage. It will, however, do well upon almost any soil that is well drained, providing it once becomes well rooted. It should never be sown on land in which the water level stands near the surface, or on land likely to be covered with water at any season of the year.

Seeding. The amount of seed usually sown is, to the acre, 30 to 40 lbs., that is with the hulls on. I would advise sowing the seed hulled, the same as you sow alfalfa. It is much easier sown, and will germinate more quickly. With hulled seed, about 20 pounds per acre will be sufficient. If sown with oats, barley or wheat, not more than about one-half the ordinary amount of grain should be sown per acre; even then the young plants are apt to be killed by exposure to the sun when the nurse crop is removed, especially if hot, dry weather follows the cutting of the grain crop. Better results are usually obtained by sowing the seed alone. The best time to sow is as soon as the ground can be got into good condition in the spring, and danger of heavy frosts is passed. On the Experimental Farm sainfoin sown alone came into bloom in August, and gave a yield of 1 ton, 1,700 lbs. of dried fodder per acre. In the second year it came in bloom on June 1st, and lasted to the 24th of June. The second cutting bloomed July 27th to August 17th. Total cut of the two crops, 4 tons, 1,600 lbs. Those dates could be extended for honey gathering, but as the plants were in the best condition for fodder, it was thought best to cut on the latter dates. A third crop is usually allowed to grow for pasture, or in favorable seasons even the third crop might be cut for hay. The present sainfoin clover plots on the Experimental Farm have been grown: One plot seven years, one plot three years, and a third sown in the spring of 1903. The plot that has been growing seven years is getting very thin, and should be plowed under. I would advise resowing every two or three years, as clovers are known to be one of the most valuable fertilizing plants grown.

Cultivation. Following are hints on preparation of the soil for growing clover, killing weeds of all kinds: Hay lands take a firm-footed cultivator; put on narrow points, say, 2 1-2 inches wide. Three horses will be required to draw this machine. Pass over your field first with the cultivator. In the second operation cross the cultivating with the harrow. This will tear the sod into very small pieces, and they will dry out in the sun very quickly. The third time over the field should be with the cultivator in the opposite direction from the first, and next the harrow. By going over your field with the cultivator four times you should have every particle of sod cut and dried out on the surface. All this working should be done on warm, sunny days. Later in the autumn this valuable mat of material should be plowed under to decay for a future crop. Stubble lands may be worked the same way. A second plan is, after the crop is taken off, to plow very shallow with a gang plow in a dry time, the land being then rolled and harrowed. It is then left untouched until grass and weeds start to grow. It is then harrowed and cultivated thoroughly at intervals to keep down all growth, and later in the autumn plowed or ribbed up with a double mold board plow into drills about 22 inches apart and 8 to 10 inches high. This is found to be a most satisfactory preparation of the soil for clover, corn, roots or grain. Where grain is sown the soil is ready for seeding at a considerably earlier date than where fall plowing is practised.

I had a great deal of trouble in getting this sainfoin to germinate. The seed is enclosed in a small husk, and I would advise every person asking for sainfoin seed to have it hulled, that is, with the husk off it.

I speak of this plant as a fertilizing plant. The great value in all clovers is that they are such deep rooters. With all those nodules that gather their food from the air, one cannot help but see that this would be a valuable fertilizing plant. Our friend Prof.

Shutt proposes next year to take a spade and dig some of it up, and analyze the amount of roots and find out what the value of it is as a fertilizer, and then he proposes to take a certain sized plot and analyze it, and find out how much honey is in this plant. The dairymen do not allow their cows to run on the commons and expect them to fill the pail with milk. We should not think of allowing our bees to go on the field, and expect them to give us one hundred or two hundred pounds of honey. We must provide for them. We think that this plant is one of the best. so far, that is grown to-day. We all swear by the small white clover, but if you had been at the Experimental Farm at the time the white clover was on and sainfoin was on, you would have seen that the white clover was not to be compared with the value of this clover as a honey-producing plant.

Mr. McEvoy : What would it be worth a bushel ?

Mr. Fixter : I think it sells at fifteen cents a pound.

Mr. Dickenson : Have you tested the quality of the honey from it ?

Mr. Fixter : We have not

Mr. Lott : What has been your experience with sainfoin as a honey-producing plant?

Mr. Fixter : My experience is this : We have not grown it in large fields ; we have never gathered it in any quantity to say that it is a great honey-producing plant. We have our small plots of different clovers, and we take notes of them at the different seasons of the year, the dates of blooming, and so on. Here is the white clover plot, and may be you can count the bees ; you can see five or six or eight or ten ; you come to the alfalfa, and may be you do not see a bee at all, or may be one or two on the tops of the bloom ; you come on to the sainfoin, and you can count one hundred bees in some spots where you would see eight or ten on the white clover.

Mr. Lott : A neighbor of mine has a small field of sainfoin and one of alfalfa, and from early morn till sundown you will find the bees in quantity upon the sainfoin. Whether it secretes honey rapidly or not I do not know, but on days when no other nectar will secrete I have noticed them from early morning till night upon the sainfoin ; I have noticed something similar on this large white clover, but I do not know as to the quantity of nectar that would secrete in the sainfoin.

Mr. Webster : I think my friend is no bee-hunter, or he would soon tell whether they were getting honey. I know very quickly when the bees are filled with honey.

Mr. Edmonson : I would like to ask Mr. Fixter about the quality of hay as between alfalfa and sainfoin.

Mr. Fixter : There has been no regular analysis made of it, but when sainfoin is cured as hay it is beautiful, and is readily eaten by the cattle.

Mr. Chisholm : What is it like for pasture ?

Mr. Fixter : We were always unfortunate in having our gates wide open to the public, and sometimes stray cattle come in as trespassers, and this autumn, after everything else was dead, this sainfoin was green, and those cattle made a bee line for that plot and ate it down.

Mr. Holtermann : I believe Mr. Fixter has a very good plant. I was at Ottawa and saw it. I hope the experiment will be carried on more extensively, and that is a direction in which the Government can do good for us.

Mr. Lott : I have heard from Mr. Wooten that in England, where this clover is used to a very great extent, it makes the whitest, clearest and best honey in that market.

Mr. Hall moved, seconded by Mr. McEvoy, that the management of the Experimental Farm at Ottawa be asked to put in a large area of sainfoin clover for the purpose of obtaining a surplus from it, so that a test may be made of the quality of the honey. Carried.

Experiments were tried wiring frames horizontally and perpendicularly.

(Mr. Fixter, in speaking of this experiment, illustrated his remarks with a number of frames wired with a different number of wires, both perpendicularly and horizontally.)

In this first frame which I show, you will see there are seven wires run perpendicularly. Put in sufficient wiring to carry your combs. I think wiring foundations is a grand arrangement, because you can use a much lighter foundation than you can if you do not wire at all, or if you only wire a few. If we can save half the weight of our foundation, why not do it? I have tried an experiment this year with section foundation. I took the frames that had the seven wires and placed my board in behind with a small wedge at the bottom. We lay our foundation on and we have an arrangement for pressing the wire into the wax, so that our sectional foundation stays in that frame perfectly. If you take special care in having the lower sheets close to the upper the bees form the cells there nearly as large. If we can save that much money in wax in using thinner foundation, why not do it? My opinion from this one test is that we can use a thinner foundation, and have it in better shape than by using a heavier foundation. We kept on going down, till we got down to wiring at one end with four wires. What was the trouble? The trouble was with the thin wax; we could not use the section foundation in that one at all. Those wires sagged, and in some instances they broke down entirely. As I am a believer in full sheets of foundation. Wire your frames every time, either up and down or across. The object of testing those different methods is to find out which is the best. We hope by other tests to say which we think is the best. We have wired crosswise; we found the trouble with that was that if you have a heavy swarm put on there they are liable to bend those wires down with the foundation, especially on a warm day; and very often with the four wires I have found the foundation doubled over, and had a great deal of trouble in cutting it out and getting it into place again. If you prefer the wire horizontally, I will say put in two more wires than we have here; but I would recommend the perpendicular.

Mr. Lott: What is the amount of time that you would consider necessary to wire frames for the brood chamber in the top story?

Mr. Fixter: I think a man could put one of them in in about two minutes. We can do this in the winter; we do not have to handle our foundation then. We place the frame in a vise. After you get to know just where to drive the staples, you do not need to have a measure; or you can just mark a stick off in the places where you want it, and lay it right in front of your vise, and you can see where to run your pencil across. Then run a very sharp awl through those different places, then tie on your wire at one end, twist it on, up, down and through till you get to the other end; or if your wiring gets tangled and troublesome, run it from one to the other end and fasten it. Different bee-keepers have different methods. I have shipped bees to the Experimental Farm in Manitoba and Nova Scotia, and never had a frame break down nor a colony smother on the road. Of course, the frames were all wired.

Mr. McEvoy: My boy and two others wired twelve hundred of those in a couple of days, and two of the boys were little fellows. For embedding wires in foundation the larger embedder is much better than the star wheel.

Mr. Fixter: We tried different plans with cross wires, and we came down to two, which is almost useless, so that I would say wire thoroughly, and you will find it is not such a hard job at all. I think there could be some improvement made on this little machine that we pressed the wire into the wax with.

Mr. Hall: I am an old hard-egg. I kicked against wiring for fifteen years, and four years ago I put in six hundred wired frames, and I was so pleased with them that I put in eight hundred, and last year nine hundred. When you run the wheel over the wire you crimp that wire, and that stops the wax from pulling down. I want my wax to go to the top of my frame, and then I have no place for the bees to go through. I put eight wires, and that pulls the bottom up, and to get over that difficulty I take some No. 9 fence wire and put a piece perpendicularly in the centre, and you can hardly pull the frames together. With the perpendicular wires I have never had the frame break down; with it wired horizontally I have had them break down from the top.

Mr. Holmes: Why not make the bottom bar slightly heavier instead of using the fence wire?

Mr. Hall: Because there is more wood for the bees to go around. I want that top bar heavy, because when I shake my bees off I want to give my frame a crack with my hand.

Mr. Byer: I do not know what I can add by way of value to what has been already said. I suppose it will be necessary for me to conduct a sort of review of three or four different items taken up, and all these items have been discussed.

In regard to Mr. Fixter's experiments in cellar wintering, I am at this disadvantage: I have never had much experience, and what knowledge I have is theoretical. Last winter I wintered thirty colonies in one cellar, and fifty in another, and as near as I could tell they were both about the same temperature. One cellar was in sandy soil, and the other was in clay soil, and quite damp, and I had taken no extra precautions for ventilation. Those in the sandy soil wintered in good shape, while the others came out in bad shape. I do not think it is a fair test to put pails of water in the cellar; I do not think it will affect it a particle. It is a different thing from putting bees in the cellar that is naturally damp. I have a cellar in mind where a spring is running through it, but that cellar is perfectly dry.

With regard to feeding in winter, I will make no comments. Mr. Fixter gave some directions as to how to prepare the food for wintering and feeding sugar syrup. I am not living in a buckwheat belt, and although sugar feeding for bees is condemned, I think this year if I had kept out sealed combs enough to put my bees all up for the winter, I would have taken the biggest part of my extracting supers. I fed this fall quite a quantity of sugar. I had my sugar in 100-pound sacks. I would go to an out-apiary with three or four hundred pounds, and take the boiler used for heating water and put one pound of water to two of sugar and bring that to a sharp boil. Dump one hundred pounds of this in a storage tank, and in a few minutes I would have one hundred and fifty pounds of syrup. I fed my three yards with all I had to feed them in three days.

With regard to sainfoin, I think it is well to encourage the growth of it, providing we know what the honey will be. As to the second crop, it may be something like second-crop alsike, the bees work on it freely, but I never could see that they got anything appreciably. Such might be the case with sainfoin.

In regard to the last matter taken up, I wire horizontally. I use a very deep frame, twelve inches, and I have never had any trouble.

Mr. Darling: I would like to ask Mr. Fixter if he used fine granulated sugar, or pulverized?

Mr. Fixter: Not pulverized. I think Mr. Hall has a better plan than any of us.

Mr. Hall: My plan for making sugar syrup is not Hall's plan at all. He uses it because it is a good plan, and you will use it too when you know. I have two out-apiaries, and if the bees want feeding I would have to bother the woman at the house at those apiaries, and I am a little diffident about annoying the women, because I want to keep on the good side of the ladies. I gave up making the two pounds of sugar and one pound of water. I put pound for pound of granulated sugar and water, and stir it up with a garden hoe about three times, and then go back again and stir it up again. Then I will have a fine liquid, perfectly transparent, and it will never granulate. I use cold water. The bees will take down from my 30 lb. feeders very often twenty-four pounds in a night. If they want twenty pounds of feed, you will have to give them twenty pounds of syrup. September is the right time to feed it in.

REPORT OF COMMITTEE APPOINTED TO AMEND THE BY-LAWS OF THE ONTARIO BEE-KEEPERS' ASSOCIATION.

By Mr. B. O. Lott, Anson.

Proposed amendment to Sec. 4: "The Board of Management shall consist of the President, Vice-President and five Directors, and they shall appoint from among themselves an Executive Committee of three, and they shall elect from among their number or otherwise a Secretary-Treasurer."

Proposed amendment to Sec. 8: "It shall be the duty of the President to preside at all meetings of the Association, to call for reports, to put motions when seconded, to decide upon questions of order, and to declare the result of ballots and elections.

The President shall also, as long as the Foul Brood demands it, direct the Inspector or sub-Inspectors, in accordance with the Act, for the Suppression of Foul Brood among Bees.

"The President shall also file all letters in connection with his duties as President of the Ontario Bee-Keepers' Association; also keep a copy of the letters sent out in said capacity, and hand the same to his successor in office.

"The Executive shall have power to call all special meetings when necessary.

"The President shall be ex-officio Chairman of the Board of Directors, and call it together when necessary."

Mr. Lott opened the discussion on the report and moved, seconded by Mr. Holtermann, that the report be adopted.

Mr. Dickenson moved in amendment, seconded by Mr. John McEvoy, that action on the report be deferred until the next annual meeting.

After considerable discussion had taken place, participated in by Messrs. Lott, Holtermann, Emigh, Dickenson, Brown, Darling, Morrison, Couse, Holmes and Gemmell, the President put the amendment, which on a vote having been taken, was declared carried.

Mr Morrison moved, seconded by Mr. Mason, that sections 19 and 20 of the By-laws be rescinded.

The President put the motion, which, on a vote having been taken, was declared carried.

CHEMICAL WORK IN CONNECTION WITH BEE-KEEPING, 1903

By Frank T. Shutt, M.A., F.I.C., Chemist, Dominion Experimental Farms

1. On the Storage of Honey.

Our experiments towards ascertaining the conditions under which it is best to store honey were begun in the season of 1902, and I was able to present to this Association at the last Annual Convention certain results that showed most emphatically that extracted honey should not be kept in a moist, cold atmosphere. The data we obtained, and my remarks thereon, are to be found in the last report (1902) of this Association, but in order to refresh your memories I shall ask you to note the following table, in which I again bring before you the more important of these results. They indicate that honey is exceedingly hydroscopic; that is, that it is capable of absorbing large quantities of water if exposed to a moist atmosphere. We further found this absorption of moisture was merely the first step towards fermentation and the spoiling of the honey.

Experiment on the Storage of Honey, 1902.

	Ripe Honey.	Water per cent.
	From capped comb	15.88
A	Exposed to dry atmosphere one month	14.24
	Exposed to moist atmosphere one month	31.46
B	Exposed to dry atmosphere twenty days	13.84
	Exposed to moist atmosphere twenty days	48.23

A: Honey placed in glass cylinder. B: Honey placed in open evaporating dish.

We have repeated this experiment during the past season with extracted honey, with similar result, and also have had under trial honey in the comb. This latter is also shown to deteriorate rapidly in a moist atmosphere. The plan of the experiment was as follows:

Extracted Honey : This was weighed into flat-bottomed, open dishes and exposed for three weeks (1) to the air of the laboratory, (2) in an atmosphere saturated with moisture under a bell jar in the laboratory, (3) to the air in a pantry of a house on the Experimental Farm, and (4) to the air in the cellar of the same house—this cellar being fairly dry and ventilated. The temperature in (1), (2) and (3) varied from 60 degrees F. to 70 degrees F., and in (4) from 50 degrees F. to 60 degrees F. during the period of storage, October 12th to November 12th.

Comb Honey : A similar series of honey in the comb, i.e., sections, were exposed, the temperatures being those already stated and the period of storage the same.

The results have been tabulated and set forth in the following charts :

Experiments in Storage of Honey, 1903.

Extracted Honey.

From October 12th to November 12th.—In Open Dishes.

Place of Exposure, etc.	Temperature ° F.	Loss per cent.	Gain per cent.
In laboratory (ordinary atmosphere)	60 — 70	2.76	
In laboratory (saturated atmosphere)	60 — 70		26.80
In house (pantry)	60 — 70	1.81	
In house (cellar)	50 — 60		3.38

Experiments in Storage of Honey, 1903.

Comb Honey.

From October 12th to November 12th.—In Sections.

Place of Exposure, etc.	Temperature ° F.	Loss per cent.	Gain per cent.
In laboratory (ordinary atmosphere)	60 — 70	1.5 — 1.26	
In laboratory (saturated atmosphere)	60 — 70		2.73 — 4.84
In house (pantry)	60 — 70	1.33 — .90	
In house (cellar)	50 — 60		1.13 — .76

Extracted Honey : Very little need be said in explanation of these results ; their meaning is self-evident. The extracted honey exposd in the saturated atmosphere showed in the course of a few days marked signs of deterioration in quality, becoming thin and watery and beginning to ferment. At the end of the three weeks' period of the experiment it was quite unsaleable, and indeed unfit for use as an article of diet. That which had been kept in the ordinary atmosphere (both in laboratory and the pantry) had not perceptibly altered in appearance or taste, and was in excellent condition. The cellar-stored sample had at the end of the three weeks begun to ferment.

Comb Honey : While not suffering to the same degree as the extracted honey, that in the comb deteriorated considerably when placed in the cllar, and still more so in the saturated atmosphere artificially provided in the laboratory. The latter before the close of the three weeks' period showed drops of water collected on the comb, and had begun to mould The comb stored in the pantry and in the laboratory at the end of the period of exposure was in first-class condition.

This investigation, therefore, covering two years 'work, emphatically points to the desirability of storing honey, both comb and extracted, in a warm, dry atmosphere,, such as may be obtained in an upstairs pantry or room. Deterioration is sure to follow exposure in a damp atmosphere, and for this reason the cellar, no matter how dry it may appear, is not a good place in which to keep honey

2. Honey Vinegar.

It frequently happens that there is more or less honey on hand which from one reason or another is not saleable. A considerable amount of honey can also be counted upon from the washings of the cappings, etc. All this may be put to profitable use by conversion into vinegar and it was with the object of obtaining information as to the strength of the solution or amount of honey per gallon that could be most satisfactorily used, that the following preliminary experiments were made:

Six solutions of honey were prepared, varying in strength from 1 lb. honey in 1 gallon of water to 6 lbs. honey in 1 gallon of water. These were placed in six 1 1-2 gallon, wide mouth glass jars about 6 inches in diameter, each jar receiving 1 gallon of honey solution. They were then "seeded" or inoculated with a little of the mother vinegar plant, and the jars covered with cheese-cloth.

A temperature of 80 degrees F. or thereabout is usually held to be most favorable for the fermentation, but this at the time of the experiment (October) unfortunately could not be obtained. The jars were, therefore, stored near the hot water coils in the upper story of the laboratory building, the thermometer ranging from 60 degrees F. to 70 degrees F., but usually from 65 degrees F. to 70 degrees F.

The acidity of the various solutions has been determined three times, to date, viz., at the commencement of the experiment, Oct. 20th, and on the 29th October, and the 30th November. The results are stated in the following table:

Acidity of Honey Solutions.

Expressed in grammes of acetic acid per 100 c. c. (Solutions kept at a temperature of 60 degrees F. to 70 degrees F.)

Honey in one gallon.	Acidity at start. 20th October.	Acidity on 29th October.	Acidity on 30th November.
1 pound	.0398	.108	.906
2 pounds	.0398	.110	.979
3 pounds	.03617	.105	.713
4 pounds	.0431	.096	.586
5 pounds	.0431	.087	.265
6 pounds	.0850	.087	.265

Though undoubtedly the temperature was too low for the most rapid conversion, the results plainly indicate that, as regards the strength of the honey solution, the fermentation is retarded when the strength of the solution exceeds 3 lbs. per gallon. As far as the work has gone, the strongest vinegar was produced from the 2 lbs. per gallon solution, and the probability is that when the trial is completed it will be shown that the most economical strength of the honey solution will lie between 1 lb. and 3 lbs. per gallon.

From time to time these solutions will be examined for acetic acid, and I trust to be in a position before the next annual convention to speak more authoritatively on this subject.

3. Aphidian Honey.

Two small samples of the so-called honey dew or Aphidian honey have been received by me quite recently from Mr. J. G. Byer, of Markham, Ont., and Mr. Robert E. Marshall, of Hamilton. Mr. Byer writes: "This honey was gathered from the basswood and the elm leaves during the latter part of July and early days of August." Mr. Marshall states: "It was gathered during August from oak and hickory leaves." Both samples possessed a peculiar and somewhat bitter taste—though the flavor to the palate at first was slightly smoky. They appeared to be somewhat thinner than mature, well-ripened honey. Unfortunately, the amount of honey in each case was too small for any extended research, but determinations of the water-content were taken, with the following results :

Water-content in Aphidian Honey.	Per Cent.
From Basswood and Elm leaves.......	20.66
From Oak and Hickory leaves......	20.24

These data indicate that as far as water-content is concerned, this so-called Aphidian honey is similar to the unripe or immature honey from uncapped cells, and it is of interest to note in this respect that Mr. Byer says the bees refused to cap the cells containing this honey.

It is to be hoped that large quantities of this interesting honey may be obtainable, so that an examination of the sugars and other possible constituents can be made. It is quite possible that through such a chemical investigation further light may be thrown upon the source of this honey, a matter of considerable dispute among bee-keepers, but a subject we need not here discuss, as there is no fresh evidence to adduce from this preliminary work.

4. Adulterated Honey.

As a member of the Committee appointed by this Asociation at our Convention last year to bring before the Inland Revenue Department, Ottawa, the desirability of an examination of bottled honey on the Canadian market, I beg to report briefly as follows :

On representing the wish of this Association and the fear that had been expressed that adulterated honey was upon the market and injuring the interest of the bee-keepers, Mr. W. J. Gerald, Deputy Minister of Inland Revenue, Ottawa, assured me that honeys would be included in the next collection of food stuffs. This was done, and in the neighborhood of 100 samples have been analysed. The results published as Bulletin No. 90 of the Inland Revenue Department have recently appeared. They show practically that 80 per cent. of the samples examined were genuine. It was evidently high time to have made this investigation. It is to be hoped that those who persist in selling adulterated honey will be punished as they deserve, for in no other way can honest honey producers be protected.

5. Adulterated Comb.

At the instance of this Association, we examined in 1890 certain samples of foundation comb, and found them to be seriously adulterated with paraffin. Since that date until the present year, as far as we are aware, no complaints have been made by bee-keepers as to the quality of the "foundation" sold in this country.

In March, of this year, however, a request was made by Messrs. Goold, Shapley & Muir Co., Brantford, Ont., for an analysis of certain beeswax they had purchased from the United States, on the ground of suspected adulteration. In the interests of the bee industry it was deemed desirable to accede to this request, and the examination was made. The results pointed to the presence of paraffin in all the samples, varying approximately from 25 per cent. to 29 per cent.

Unlike the adulterated "foundation" of 1890, these samples possessed a melting point practically identical with that of genuine beeswax, showing that the adulterant must be of the nature of ozakerite or cerasin—the former a naturally-occurring paraffin, and the latter its refined product.

We are informed that the firm in the United States, on the receipt of our report, made no demur to the return of the consignment, a course at once acted upon by the Canadian manufacturers on learning from us that the wax was not genuine.

Mr. Byer : In that sample submitted, was the saccharine matter made of the same material as levulose honey ?

Prof. Shutt: You refer to this aphidian honey? That is what I would like to know myself.

Mr. Dyer: One peculiarity in that sample is that the bees were working on the bass wood trees, and you could pick out two trees not two rods apart, and they would be working freely on one and not on the other. You could not see anything of the aphids. If it is aphidian honey, it is not fit for use; if it is atmospheric it is all right.

Mr. McEvoy: Dr. Howard, of Texas, says it is atmospheric mostly.

Prof. Shutt: It is not from the atmosphere at all; it is from the tree.

Mr. Dyer: It has always been after an extremely dry spell that I have had anything to do with it.

Prof. Shutt: Could you tell the difference between honey of that character and other honey, not clover honey?

Mr. Hall: The bees will not winter on it, or at least they winter badly and die in the spring.

Prof. Shutt: Our desire is what it always was, to help on the bee-keepers, the same as it is in every other class of agriculture, because we look upon you to a certain degree as live stock men. If we are not able to do much, you know it is not from want of inclination, but from want of time. I am not going to apologize for the meagreness of the results I bring to-day, but I offer these few remarks as an explanation of why I have not anything of any very great scientific value to present to this convention. (Applause.)

Mr. Gemmell moved, seconded by Mr. McEvoy, that a vote of thanks be tendered Prof. Shutt for his valuable paper. Carried.

DIRECTORS' REPORT.

Mr. Darling presented the report of the Directors, as follows:

The season of 1903 has come and gone, and the year has been rather peculiar, in that while the west and centre of the Province have been favored with good crops, the east has suffered a comparative failure.

The sum of $200 was set apart for Affiliated Societies, all of which has been paid according to by-law.

The usual grants of $25, $10 and $10 were made to the Toronto Industrial, Western, and Central Canada Fair Associations respectively.

After communicating with the Minister of Agriculture for the Dominion, it was decided to collect 1,500 or 1,600 pounds of extracted and 400 or 500 pounds of comb honey, to be placed in the St. Louis Exposition.

This matter is being attended to at the present time.

The Treasurer's report shows that our finances are in good condition, but not as good as we could wish, as a small sum which should have been paid last year was left over to this year; also the expenses of this meeting have been somewhat heavy. Otherwise our finances would be ahead of last year.

As has been customary for several years, the "Canadian Bee Journal" has been sent to the members of the Association, also a copy of the Annual Report.

At a meeting of the Executive Committee held later it was decided to supplement the grant to the Industrial Exhibition by $20, in view of it being a Dominion Exhibition.

Upon motion of Mr. Darling, seconded by Mr. Brown, the report was received and adopted.

TREASURER'S REPORT.

Mr. M. Emigh presented his report as Treasurer, duly audited, and on motion it was received and adopted. It will be found on page 3.

REPORT OF THE INSPECTOR OF APIARIES.

By Wm. McEvoy, Woodburn.

During 1903 I visited bee yards in the counties of Huron, Middlesex, Perth, Brant, Peel, York, Ontario, Simcoe, Norfolk, Haldimand, Victoria, Lanark, Leeds and Russell. I inspected ninety-six apiaries, and found foul brood in twenty-eight of them, and dead brood of other kinds in many others, which had been mistaken for foul brood. Some of the dead brood was the result of spraying fruit trees while in bloom, and in other places I found it to be starved brood, and not foul brood at all. I received orders to go to certain localities as soon as possible, where some men claimed that they had located several cases of foul brood. When I got there I found that the big losses in bees were the result of starvation. After I had received orders to go to other localities, where several apiaries were said to be very bad with foul brood, and when I got there and examined every colony I found them completely cured, and not a trace of the disease left.

No Province or State in the world was in as bad a condition with foul brood as Ontario was when I was first given charge of the Province thirteen years ago last spring. It took time to get the people taught so that they could cure all diseased apiaries by all my methods of treatment from May to October, and at the finish to have every colony in first-class condition. It is over twenty-eight years since I discovered how to cure my foul brood apiary from May to October. If I had only been able to cure during the honey season I never would have accomplished much or been of much use to the Province; but I have also been able to finish up the curing with my fall treatment, where the mistakes were made

I have driven over 90 per cent. of the disease out of the Province since 1890, and if the bee-keepers had sent me in a list of the diseased apiaries like they used to do, so as to give me a chance to know where the disease was, and then helped like they should have done, I would have had the disease all out, or nearly so.

No man in Ontario knows the true condition of things as well as I do, and I positively declare that Ontario has not one-tenth of the diseased apiaries now that she had ten years ago. The disease is now completely under control, and all that any person has to do is to send in a list of the diseased apiaries, and have them cured, and cured in the most profitable way at that. My time, car fare, and livery total $753.60.

Mr. Darling moved, seconded by Mr. Dickenson, that the report be adopted.

After considerable debate, Mr. Hall moved, seconded by Mr. Weir, that the discussion on this report be suspended until after Mr. James had addressed the convention. Carried.

ADDRESS

By C. C. James, Deputy Minister of Agriculture, Toronto.

I have come to this meeting to listen to your discussions and hear what you have to say, rather than to give you any information or enlighten you. The Minister and myself make a practice, as far as possible, of attending all conventions to which we are invited. We do this in order that we may keep track of the work that is being done by the Association working in harmony with our Department, and that we may meet the men concerned. You can find out a great deal more about the working of the Association by coming and sitting here and listening, than by reading the reports or listening to delegations. The remark has been made in our Department more than once, in looking over your reports for the press, that the members of this Association appear to be living up to their business. There is a good deal of honey in it, as well as a good deal of the sting of the bee. (Laughter.) And it is well that the two are mixed, or rather that some of the stinging questions and remarks are afterwards soothed over by the sweetness of the honey. I am very glad, indeed, to see, though these discussions become more or less heated, that the members do not forget themselves, but that more or less of what we call gentlemanly treatment is found to wind them up. It augurs well for an association to have active, live, wide-awake members, if you do not carry your discussion to too great length. I am sure nothing but good will result from keen, close criticism of these questions—the one we had up this afternoon, and the foul brood question, which is coming up to-night.

Before I make any further remarks, I would like to refer to one question which we have under consideration at the present time. Your Secretary has had a letter from the Minister, who called me in just before he was leaving for Chicago to attend the Live Stock Fair there, knowing I was coming down here, to tell me he had written, not a letter of invitation exactly, but one making a suggestion, and he hoped you would fall in with it. An explanation might be in place: You are quite well aware that for the last three or four years we have been developing at Guelph a live stock institution which has become the greatest educational fair held on the American continent. I do not think that is putting it too strongly, for that is what the great American live stock men themselves state. Next week this fair will be held there; not so large as the Chicago fair, but in its educational and beneficial features far outranking even that. After some four or five years we have brought that up to what may be considered its maximum condition; and we have thought, especially in connection with the fruit growers' movement in this country, that a fair somewhat along those lines might be inaugurated to benefit the fruit-growing interests; and then the question came up at once, if that is so, why could we not take in and affiliate with the honey interests? I do not know whether we are not going to work that out or not. The proposition is to have the Fruit Growers' Association meet in Toronto next year, say in the month of November, and the probability is if we can get suitable accommodation we will make the experiment of having in connection with it an Ontario Fruit Fair, at which fruit will be exhibited, and at which all the implements and instruments used in connection with fruit growing will be exhibited, and special instruction given. If that is done, could not the bee-keepers come in, co-operate, and share in the benefits? (Hear, hear.) If that should develop we would like to have your co-operation. I do not say yet that it will, but we are thinking seriously of it, and if we can get the building, and get the ground we are looking for, I think we will have the hearty co-operation of the fruit men, and it would be a fine thing for the fruit, honey and flower industries of this country to become united—fruit, honey and flowers. In connection with it, you might have your annual meeting Do not lay your plans definitely too soon until you see what is likely to be done in connection with that, and if we decide to go on with it. I trust you will come in with us and help to make it a great success. The idea will be to begin on a small scale, and gradually build up until it assumes Provincial, if not Dominion proportions.

I am sorry that the bee-keepers have not been able to hold their meeting here in Trenton earlier in the year. You come, and you are entirely concerned with the business of this meeting, and you seem to have more business than you will be able to get through with and properly settle. I do not know whether those who have come from a distance understand you are meeting here at, so to speak, the gateway to one of the most beautiful spots in the Province of Ontario, in fact in the whole Dominion of Canada. I know what I am speaking about, because I was brought up at the other end of this beautiful Bay of Quinte, and spent many a year near its shores. We are here on a spot that I say is one of the most beautiful spots in all Canada If you were here in the summer time, and could take a boat and go up and down this beautiful bay, especially in the month of June, when the shores are green and the orchards in such fine condition, you would be charmed with the appearance of it, and go away with a very much better idea of the town and locality than you can have by visiting it in the winter. You are on historic ground, too. Just past the place where we are sitting the old French fur traders, the first explorers of this country, went up and down through this old historic Trent Valley. There are historic associations, then, in addition to the beautiful scenery. It is almost exactly one hundred and twenty years since the first settlers were set down in this section—one hundred and twenty years this fall. It was in 1773 that the surveyors came up from Quebec with a few advanced explorers. They went around this bay and spied out the land, and found it was indeed the promised land for those who had been compelled to leave the farms and comfortable homes across the lake on the Hudson and Mohawk Rivers. They were quite satisfied with this section. In the early spring of 1784 they came into this country. The primeval forest densely covered the land along these rivers, and upon the shores of the bay. From 1784 to the beginning of 1904 is just one hundred and twenty years, and the agricultural development of this section, which will correspond also with the agricultural development of some other sections of this Province, has been one of very great progress and interest. If you pick up one of our text books in history at the present time, and look it over, I doubt very much if you will find anything that would refer to that development. You will find a great deal about the various wars that have taken place, especially about the first war of conquest ; perhaps a little about the settlement of the original settlers on some of these lands ; find a good deal about the war of 1812 and the Rebellion of 1837, and the Fenian invasion, and a little about our legislative enactments ; but I do not know that you will find much in any of our histories in regard to the development of the people just such as you are, the men who have made their living out of the fields and the forests and the orchards of this country. And, after all, it is in the history and development of people just such as you are that the true history of this country should be made. It is all very well to understand about the keen struggles that have taken place for maintaining possession of this country, but it has always seemed to me that that unwritten history of the common people, of the agricultural classes, of the great laboring classes, after all, is the true and genuine history of a country. (Hear, hear.) I have said it is just one hundred and twenty years since the first settlers were located around this bay. When the surveyors came in they started at Kingston, and the first township there was surveyed and called No. 1, and then came No. 2, 3, and 4 ; then they crossed over into Prince Edward County and numbered the others, and came around the head of the bay to the Indian Reserve below here. In all they surveyed eight or ten townships, and for many years these townships went simply by their numbers, township No. 1, 2 and so on ; later on they were given the names that they bear to-day. If you take from 1784, when these first settlers came in here and hewed out their little clearing and built their log houses, and set up what few family possessions they had brought with them—if you take thirty years from that it will bring you down to 1814. Thirty years is a generation. So that from 1784 to the close of the war, about 1814, we have the first generation of settlers in this section ; and the agriculture of that period must have been of a very crude form indeed. After the trees were cleared away so that they could sow small patches of grain, you can easily see there was practically nothing left to be sent to market except the trees that had been cleared away ; so that for the first generation of the first thirty years of the settlement the two main articles that the farmers had to send to market consisted of timber and ashes. I am giving you these facts to put before you a bird's-eye view of the development of this section in which we are meeting, to show what wonderful strides we have been making. That first thirty years belongs to the farmers as the producers of those two marketable articles, timber, and ashes. The ashes were sent across the line, sometimes they were more or less reduced to potashes. The timber was floated down these streams to Kingston, Montreal, and Quebec. After the war of 1813 and 1814 we come to the next thirty years of the agricultural development of this section—to 1844. Now, they had cleared around this bay sufficient land to enable them to grow grain, and in place of solid forests we had extensive fields, where wheat and oats and other grain crops were grown. The farmers had taken quite a decided move forward, and they were beginning to ship from along the Bay and along the St. Lawrence large quantities of grain; and wheat was then the great marketable article. Those were the days when wheat was king here in Ontario, just as wheat is king to-day in Manitoba and the Northwest. Now, from the crude forest products to grain was quite a step in advance. Then we move on to the next generation, from 1844 to 1874, and perhaps this period will appeal to a great many of you who come from other sections. It was during that period that the great movement set in from England, Scotland and Ireland. After the close of the great Napoleonic wars in the Old Country the regiments in the Old Country disbanded, and homes had to be found for many of them. Large numbers of these soldiers were sent to this country, and following in their track came a steady stream; Scotchmen, Irishmen and Englishmen came across the ocean in small sailing vessels and up the St. Lawrence, around the Bay of Quinte, and along the lake, and began the settlements to the north and west of the old original settlements. The coming of these old country settlers made quite an important change in the agriculture of this Province. The Old Countryman, as a rule, is very fond of stock. I do not know whether the thought has ever struck you or not, but if you go to London, in England, as a centre, and draw a circle of, say, two or three hundred miles from that, you will surround practically all of the original homes of the best cattle, sheep, swine, and horses that we know to-day. In the northern part of France and Germany, in England and Scotland and part of Ireland, in that little northwestern section of the European continent, we have the original homes of nearly all the best pure-bred strains of live stock. So, as these old country settlers began to come over in a steady stream from the old land, they brought with them into our agriculture a new element, that is, a love for fine, high-class stock. To that period we date back the beginning of our Shorthorn industry, our best breeds of horses, our best sheep, our best breeds of swine. So, coming up to the third generation, we have advanced from the grain-growing condition to the live stock condition. That brings up down to 1874. Then, from there on to 1904, to the thirty years we have just passed through, we have added a further development; we have had the development of our dairying industry, the development of our fruit industry, and I think we have had a fairly good development in our honey industry. If it belongs anywhere it belong to that last generation. We have been rising step by step in the grades of agricultural work. First of all it was in a very crude condition; then we got onto the higher level of grain growing; then a step higher into the line of the production of pure breeds of stock, and later we have gone into those specialties of butter, cheese, fruit and honey, so that now we have become, so far as agriculture is concerned, a community producing these specialties. Hence it is that we have to-day not simply the old agricultural society of forty or sixty years ago, which was a comprehensive society, taking in everything and looking after everything, but we have found it advisable and in fact necessary, that all these lines of special work require their organizations to help and assist; and so we have developed the Fruit Growers' Association, and so we have developed the various Live Stock Associations, and so you have developed also the Bee-Keepers' Association, with which you are interested. The question that would next naturally propound itself to one considering this subject is, what will the next thirty years do? Are we going to specialize still further or make still more rapid progress in development in the lines we are following out? We are no longer a grain-producing country. It would be very foolish on our part to think the agriculturist should be made to depend in any particular on the production of grain. Grain growing now is an important feature of our work simply as it helps to build up one of the higher industries. I think we shall always continue to be one of the choice live stock breeding sections of the North American continent. You have read in the paper in the last day or two, perhaps, that our Ontario breeders have been practically sweeping the boards at Chicago this week with their lines of live stock. (Applause.) It is in this line in which they excel. We go over every year and we open the eyes of the Americans. In fact, I suppose, we open the eyes of our own people to quite a great extent. They say: "Isn't it wonderful that the Ontario live stock breeders go over there and capture the majority of prizes along certain lines—Shorthorns, sheep and so on?" The matter is very easily understood if you go back to the foundation of it. We have, to start with, a country which is eminently adapted to the raising of live stock. We have a good soil, a good climate, and good water. I do not know that you can find any other section of the North American continent that has these three elements so well united as we have right here in the Province of Ontario. Take one of the Western States. People say: "Why cannot they grow out there just as fine stock as they do in the Province of Ontario?" They have just as good air, good soil, perhaps as good as we have, but they have not the third element—they have not the water. Go somewhere else, and they may have the water, but they have not the soil. Then, add to that the fact that the foundation of our stock here has been brought from the original homes in the old land—from England, Ireland and Scotland. We have the soil, the climate, the air, and the stock to begin with; and then we have imported from the old land the men who have been trained and brought up to it for generations. So that I think we may safely look to it that this Province, all things considered, is likely to continue to specialize along that line of high-class stock. We have also shown that in our dairy work we have gradually built up a very fine industry. There is no reason why we should not continue to still further improve. Our fruit work, I think, is just beginning to open up. The possibilities of the fruit growers in the Province of Ontario are something beyond our present calculation. It simply depens upon the demand elsewhere, and the providing of facilities for transporting our fruits to the markets of the world. You are located here, I suppose, in one of the very finest apple-growing sections in the Province of Ontario. You have only to get into a storage warehouse here, and examine the fruit, and if you have never seen first-class apples before you will be able to see them here. This northern section along the shores of Lake Ontario from Kingston on the east to the head of the lake is probably one of the best apple-growing sections on the North American continent for certain varities. There are other sections, the north shore of Lake Erie, the east shore of Lake Huron, and the south shore of the Georgian Bay, around Lake Simcoe, and part of the Ottawa Valley and the St. Lawrence, which are also remarkably adapted for other varieties of apples; but here we have along this north shore a section that is not surpassed anywhere in Canada for the growing of certain varieties of apples and pears. They have not gone into the business of growing peaches, for the reason that they can grow apples here and sell them, and buy better peaches than can be grown in the east.

Right along with the fruit industry comes the development of our honey industry. You have been told that in the Old Country and elsewhere in Canada there is an unlimited market for honey of the right quality. I suppose that is a truism. There is always an unlimited market for first-class goods, no matter of what nature, and the trouble always is that there is so much of second and third rate material on the market and so little of the first-class. If this Association can do nothing else than help to raise that second and third class up to the first class, then you will be doing not a little towards developing the wealth of this country and improving the condition of the great agricultural class with which you are intimately associated. Now, you know more about that phase of it than I do. I thought that probably a few of these other points in connection with the original settlement and development and the relationship of this country where you are now located might perhaps add some little interest to your visit here, and you might possibly carry away with you some recollection of the old town of Trenton that might have escaped you had your attention not been called to it. You are meeting here on historic ground, and if you are ever along this way in the summer time, whatever you do, do not miss taking the boat at one of these points and taking the trip down through this beautiful Bay of Quinte, and I think you will thank me for the suggestion, for you will be well repaid by its beauty. Some of the finest orchards in the Province are on the shores of this Bay.

Twenty-five years ago the agriculture of this section was of an entirely different nature from what it is to-day. I have myself seen a row of farmers' wagons a mile and a half long waiting at the elevator to deliver barley, which was worth in some years from $1 to $1.25 a bushel. The farmers went barley crazy. It was shipped across the water here to Oswego and Rochester. It always struck me in those days as most remarkable that these old temperance men around the Bay should be growing barley in such enormous quantities. Their temperance principles did not seem to lead them to cut off the barley supply. They were growing barley and making money very fast, and impoverishing their farms, and suddenly the American market was cut off in a moment and the farmers left stranded. A more hopeless and helpless lot I do not think was ever found on the American continent than the farmers on the Bay of Quinte after the American barley market was cut off. What has brought about the improvement? The farmers in all this Bay section are well to do; they are happy and prosperous once more; their farms are getting into fine condition. They have brought in other products; they have begun to specialize. Cheese factories have gone up; they are making butter and cheese, and their orchards are beginning to produce. In place of the old barley which was impoverishing their farms they are now producing and sending to the market more saleable and valuable articles, and the sale of which is not impoverishing but rather enriching their farms.

Sometimes we think we are pretty hard hit when we do not get everything just as we like it. but by making the best of what seems to be untoward circumstances and difficulties we very frequently put ourselves in a far better position than we were before. They have had their difficulties. They have got over them, and they are in far better shape to-day than they ever were. The dairying industry has developed along with the great pork and bacon trade, and I suppose the farmers of Ontario are in better shape to-day than they have ever been. Take one example that came under my observation the other day: The cheese of the Provinc of Ontario is all marketed through cheese boards--Belleville, Madoc, Napanee, Kingston, Gananoque, and so on—and the cheese from all the factories around is sold through that cheese board. Now, the Brockville Cheese Board is one of the largest in the Province. It takes up the cheese produced and handles it over a large portion of the Counties of Leeds and Grenville; not all, however, because there are other boards not very far away. There was sold this year through that board cheese worth sixty per cent. more than was sold last year. Last year was one of the best years they ever had, but this year, on account of the favorable weather, good pasturage, and so on, it was thirty per cent. ahead of last year, and the price thirty per cent. better than last year. The consequence has been that through that cheese board there has been sold this year cheese to the amount of $1,700,000. Think of the effect of that on the farmers around that section. It simply puts those farmers on their feet—we hope it will not carry them off their feet—and it means at the same time that the town of Brockville has at its back that much wealth to keep it going, because all that money must gradually come in through that town. Talk about the value of factories in a town! Talk about town industries! Do you think they could start up in the town of Brockville twenty factories that would insure them to anything like the extent that the cheese industry does around there. Now, the possibilities of the development of the honey industry are exceedingly great. You have hardly touched the fringe of it as yet, if we can only get the trade in proper shape to the Old Country and the Northwest, and these must come; and the bee-keepers of this Province will be acting wisely if they shape their course so as to take possession of that Northwest market in proper shape and also look after the Old Country market. There is only one way in which it can be done. You cannot deceive the Britisher more than once. It is only by keeping the quality up, and the box well filled up to a proper limit, that you will be able to satisfy him and keep yourself in good accord with him.

I hope your meeting may be very successful, indeed, and no matter how warm your discussions may be, that you will not allow them to get beyond the proper limit; but that out of them, no matter how warm they may become, there will come the greatest benefit to the industry with which you are connected. (Applause.)

The Secretary read communications from the Hon. Mr. Dryden, and from Mr. W. H. Bunting, President of the Fruit Growers' Association, re holding a joint convention in Toronto.

Mr. James: The idea is not that you sink your identity; you will hold your meeting separately, and perhaps have one joint meeting, for instance, in the evening.

Mr Byer: What about Mr. James' suggestion as to the appointing a committee to meet this Railway Commission?

Mr. James: The Fruit Growers' Association have had a Transportation Rates Committee working for three or four years, and they are just beginning to make some headway. You know how difficult it is to get anything done at all. If you start this year you may perhaps get something in a couple of years from now. It might be a good idea to appoint a committee to co-operate with other committees of a similar character.

The report of the Inspector of Apiaries was then taken up, and a lengthy discussion followed. Some heartily supported the Inspector in his work; some offered warm criticism of his methods at various times. The Inspector admitted that at times he might not have adhered strictly to the letter of the law, and the regulations prescribed, but that in all cases he had tried to do the best for the honey industry, and that the results justified his actions. By assuming more authority than he really had, he had been enabled to settle many disputes without recourse to the law. A motion was made to adopt the report, which was carried.

ELECTION OF OFFICERS.

The election of officers was then proceeded with, and resulted as given on page 3.

Mr. Morrison moved, seconded by Mr. Hall, that the Association recommend the withdrawal of the grant to the various exhibitions, and that no representative be appointed. Carried.

Mr. Emigh moved, seconded by Mr. McEvoy, that Messrs. Sibbald and Pettit be the Revising Committee for the coming year. Carried.

Mr. Shaver moved, seconded by Mr. Lowry, that the Association hold its next annual meeting at Toronto at the same time as the annual meeting of the Fruit Growers' Association. Carried.

Mr Morrison moved, seconded by Mr. Armstrong, that Messrs. Holtermann, McEvoy, Byer, and the mover and seconder, be a committee to consider amendments to the Foul Brood Act, and bring in a report at the next session.

EXHIBIT OF HONEY AT WORLD'S FAIR, ST. LOUIS, 1904.

John Fixter: Before leaving Ottawa I saw Mr. Hay, who has charge of putting up the exhibit at St. Louis, and he asked me to explain to this Association the trophy he proposed to build there. He has left a great deal in the hands of Mr. Couse in the way of collecting honey and wax and other bee products, and all he asked me to do was to explain the way in which the exhibit was to be put up. From the drawing he has at the present time, I think the trophy will be a credit to the bee-keepers of this country. The base of it is to be 12 feet wide, and the four corners are to be built up with section honey, one section deep and four sections wide on the face of each corner. On the front of that is to be plate glass, so that the section honey can be clearly seen through it. Then to decorate the corners there is to be fancy wax made up in different styles. The front of that trophy is to be arranged with sheets of foundation of different brands, and also different plates of wax. The roof of this trophy is to be arranged with sheets of foundation. The centre part of it is to be built up with extracted honey. There is to be a very large trophy put up in the centre of this outside frame, and fancy bottles are to be arranged one above the other. I think from the arrangement of this trophy shown in the drawing it will be really a beautiful thing. I think the bee keepers of this country are quite safe in letting Mr. Couse take charge of their honey. I think there is not the slightest doubt but that the trophy will be a credit to our country and will far surpass anything that has ever been put up.

Mr. Couse: I might say you are aware there was a motion passed at the last annual meeting that if the Executive saw fit to make an exhibit at St. Louis they should do so. At the meeting of the Executive in the fall the matter was brought up, and a motion was passed to the effect that if the Dominion Government were going to make an exhibit at St. Louis, the Ontario Bee-keepers' Association would be glad to assist them, and I was advised to write to the Minister of Agriculture at Ottawa to this effect. I did so. I got a reply immediately that the intention was to make an exhibit, and they would be glad to have our assistance. Mr. Hay, who has charge of it, wrote me that he would call on me. He came out, and wanted to know what we usually had done in collecting exhibits. I told him it was to send circulars out and get offers from the beekeepers of sending what they wished, and he thought that would be a good way to get a representative exhibit from different parts of the Province and Dominion. They question came up as to who would look after it, and he asked me to do so. I told him I was simply acting for the Executive, and I would not care to do so unless the Executive wanted me to do it. He wrote to the Executive, and they sanctioned my appointment to this work, and to the issuing of circulars to the members of this Association. The intention is really to pay for the honey. I think in that way a better sample will be obtained, and we will try to get samples from British Columbia and as far north as Edmonton, and east as far as Prince Edward Island, for the purpose of making it as representative an exhibit from Canada as possible. The Department are very enthusiastic in getting a nice exhibit of honey. It is really encouraging to find they wish to help us. The honey is to be inspected before it is sent forward, and everything that is not put on exhibition is rejected. The advice is sent out to the different persons not to send it at all if it is not really good. Mr. Hay. wants some wax and foundation, and there will be a small exhibit of vinegar sent. The space is not very large, and he is rather inclined to exhibit honey only.

Mr. Fixter: This trophy is to be exactly the same as the maple syrup trophy. The centre of that trophy, instead of being taken up with bottles of honey, is to be taken up with trees, so that the two, one situated opposite the other, will be really a beautiful sight. They are going to have the old way and the new way of catching the sap and making sugar illustrated.

HONEY EXCHANGE.

Grading Rules.

Fancy Comb Honey. All sections to be well filled, combs straight, of even thickness and firmly attached to all four sides; both wood and comb unsoiled by travel stains or otherwise. All cells sealed except an occasional cell next to the wood; free from pollen and not to weigh less than 14 oz.

No. 1 Comb Honey. All sections to be well filled, combs straight, firmly attached to all four sides, the combs unsoiled by travel stains or otherwise, all the cells sealed except an occasional cell, the outside surface of the wood well cleaned from propolis, comb free from pollen and to weigh not less than 12 oz.

No. 2. All sections to be well filled; combs may be uneven, crooked or detached at the bottom with a few cells unsealed or slightly soiled; to weigh not less than 10 oz.

Extracted Honey, No. 1. Must be good body, color, and flavor.

AFFILIATED SOCIETIES' REPORT.

The following eleven societies have been in affiliation this year: Glengarry, Norfolk, Oxford, Simcoe, York, Russell, Haldimand, Brant, Middlesex, Halton District, and Victoria. This is an increase of two over last year.

Each society received a grant of $18.18, being an equal portion of the $200 appropriated.

There are two or three reports not in yet, but the balance show they have expended their grants, mostly according to the by-laws.

The reports, as far as received, indicate a prosperous season.

W. COUSE, Secretary.

Upon motion of Mr. Brown, seconded by Mr. Holmes, the report was adopted.

The following proposed amended Act for the Suppression of Foul Brood Among Bees was presented, and on motion of Mr. Morrison, seconded by Mr. Holtermann, was adopted:

(See Appendix on next page.)

The Secretary read a resolution passed by the Norfolk Bee-keepers' Association re Inspector of Apiaries, which, on motion of Mr. Morrison, seconded by Mr. Darling, was received and filed.

The Secretary read a resolution from the Simcoe County Beekeepers' Association, which, on motion of Mr. Trender, seconded by Mr. Holtermann, was received and filed.

The Secretary read communications from Prof. Harrison and Mr. Creelman, Superintendent of Farmers' Institutes.

Mr. Couse moved, seconded by Mr. John McEvoy, that the Department of Agriculture be tendered a vote of thanks for the interest taken by the Department in the Association. Carried.

Mr. Holtermann moved, seconded by Mr. Couse, that the President and Secretary of the Simcoe and Norfolk County Bee-keepers' Association be appointed a committee to send specimens of foul brood to Prof. Harrison at Guelph, the same privilege being extended to any other of the affiliated societies who might desire to do so. Carried.

Mr Morrison moved, seconded by Mr. Brown, that the Dominion Government be asked to place an exhibit of honey in the Permanent Exhibition in the Crystal Palace, London, England.

Mr. Byer moved in amendment, seconded by Mr. Dickenson, that the Secretary be asked to communicate with the proper authorities for the purpose of ascertaining whether this exhibition is under Government inspection, and if so that they be asked to make the exhibit. Amendment carried.

The President named as a committee on transportation Messrs. Lott and Couse.

Mr. Couse moved, duly seconded, that a cordial vote of thanks be tendered to the Local Bee-keepers' and the Mayor and Corporation of the Town of Trenton for their courtesy to the members on the occasion of this annual meeting. Carried, with applause.

The convention then closed.

Appendix.

The Minister of Agriculture received a communication from the Beekeepers' Association stating that the Society had recommended certain amendments to the Foul Brood Act. The Act as amended had been drawn up by a Committee appointed at the recent meeting held at Trenton. The new bill would make radical changes in the methods of work and might seriously affect the Legislative Grant for this purpose. It also proposed changes which would materially lessen the field of work and the importance of the Provincial Association. For these reasons the Minister thought it advisable to have the proposed bill printed and placed in the hands of the members for further careful consideration. The bill as recommended by the committee is, therefore, printed in this report, and along with it we have printed the Act as it now stands. The Minister is anxious to have the Act in as effective form as possible, but he thinks the proposed bill should receive the very careful consideration of all the members before it is submitted to the Legislature. He feels certain that when it is read as it stands here it will be seen that there are certain changes proposed that are not in the best interest of the work of the Provincial Association.

C. C. JAMES,
Deputy Minister of Agriculture.

THE PROPOSED AMENDMENTS TO THE ACT FOR SUPPRESSING FOUL BROOD AMONG BEES.

NOTE.—Suggested amendments to the present Act are in italics. Words to be struck out of the present Act are in brackets [ ].

HIS MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1.—(1) The Ontario Bee-keepers Association shall at each annual meeting, or the directors of said association shall, if in the interval between two annual meetings the occasion arises, appoint an inspector of apiaries and a sub-inspector for the Province of Ontario. *Any organized or district bee-keepers' association in affiliation with the Ontario Bee-keepers Association may, in the manner hereafter given, appoint a sub-inspector for the district they represent,* [and the] *said inspectors and sub-inspectors* shall be elected by the vote of the majority of the members of said association present at the annual meeting, or the vote of the majority of the directors, as the case may be. Any annual meeting may delegate [the annual] appointment of an inspector and sub-inspector to the newly elected board of directors. *Sub-inspectors' appointments to be subject to the approval of the Minister of Agriculture, and to be paid out of the Government grant, and the amount to be expended by the county or district association to be fixed from year to year, by the Minister of Agriculture.*

(2) The said sub-inspector may, when so directed, as hereinafter provided, perform all the duties and exercise all the powers in this Act directed to be performed or exercised by the inspector, *aside from burning bees,* and the provisions of this Act relating to the inspector shall be deemed to apply to and include the said *sub-inspectors.*

(3) The inspector *or sub-inspector* on entering any premises in the discharge of his duties shall, if so required, produce the certificate of the president of the said association that he has been appointed as such inspector or sub-inspector as the case may be.

2. The said inspector and sub-inspector shall hold office for one year from the date of the annual meeting at which they were appointed, or if they are appointed by the directors, then until the next annual meeting after such appointment, and shall be eligible for re-election, but the said inspector or sub-inspector may at any time, subject to the approval of the Lieutenant-Governor in Council, be removed from office by the directors for neglect of duty or [any] other sufficient cause, and in case of such removal the directors shall without delay appoint a successor.

3. [The] said *inspectors or sub-inspectors* shall, whenever so directed by the President of the [Ontario Bee-Keepers'] Association *which appointed him*, visit without unnecessary delay any locality [in the Province of Ontario] *within the jurisdiction of the association appointing him*, and there examine any apiary or apiaries to which the said president may direct him, *inspecting every hive and comb*, and ascertain whether or not the disease known as "foul brood" exists in such apiary or apiaries, and whenever the said inspector *or sub-inspector* is satisfied of the existence of foul brood in its virulent or malignant type, it shall be the duty of the inspector to order all colonies so affected, together with the hives occupied by them, and the contents of such hives, and all tainted appurtenances that cannot be disinfected, to be immediately destroyed by fire under the personal direction and superintendence of said inspector. *The sub-inspector shall report the case at once to the President of the Ontario Bee-Keepers' Association*, and after inspecting infected hives or fixtures or handling diseased bees, the inspector *or sub-inspector* shall, before leaving the premises or proceeding to any other apiary, thoroughly disinfect [his own person and clothing] *or burn any tool or instrument used by himself in the said apiary*, and shall see that any assistant with him [also thoroughly disinfects his person and clothing] *does the same*; but where the inspector *or sub-inspector* who shall be the sole judge thereof, is satisfied that the disease exists but only in milder types, and in its incipient stages, and is being or may be treated successfully, and the inspector *or sub-inspector* has reason to believe that it may be entirely cured, then the inspector may in his discretion omit to destroy or order the destruction of the colonies [and] *or* hives in which the disease exists. *The inspector or sub-inspector shall, season permitting, re-visit and examine the inspected apiary within thirty days.*

4. The inspector *or sub-inspector* shall have full power, in his discretion to order any owner or possessor of bees, dwelling in [box] hives *with non-movable combs* in apiaries where the disease exists, [being mere boxes without frames] to transfer such bees to movable [frame] hives within a specified time, and in default of such transfer the inspector may destroy or order the destruction of such [box] hives and the bees dwelling therein.

5. Any owner or possessor of diseased colonies of bees *or honey*, or [of] any infected appliances for bee-keeping, who knowingly sells or barters or gives away such diseased colonies *or honey*, or infected appliances, shall on conviction thereof before any justice of the peace be liable to a fine of not less than $50 or more than $100, or [to] imprisonment for any term not exceeding two months.

6. Any person whose bees have been destroyed or treated for foul brood, who sells or offers for sale any bees, *honey*, hives or appurtenances of any kind, after such destruction or treatment and before being authorized by the inspector *or sub-inspector* so to do, or who exposes in his bee-yard or elsewhere any infected comb, honey, or other infected thing, or conceals the fact that said disease exists among the bees, shall on conviction before a justice of the peace be liable to a fine of not less than $20 and not more than $50 or to imprisonment for a term not exceeding two months and not less than one month.

7. Any owner or possessor of bees who refuses to allow the inspect or *or sub-inspector* or [his assistant or] *their* assistants to freely examine said bees or the premises in which they are kept, or who refuses to destroy the infected bees and appurtenances, or [to] permit them to be destroyed when so directed by the inspector, may, on [the] complaint of the inspector *or sub-inspector* be summoned before a justice of the peace, and on conviction, shall be liable to a fine of not less than $25 and not more than $50 for the first offence, and not less than $50 and more than $100 for the second and any subsequent offence, and the said justice of the peace shall make an order directing the said owner and possessor forthwith to carry out the directions of the inspector *or sub-inspector.*

8. Where an owner or possessor of bees disobeys the directions of the said inspector *or sub-inspector*, or offers resistance to, or obstructs the said inspector *or sub-inspector*, a justice of the peace may upon [the] complaint of the [said] inspector *or sub-inspector*, cause a sufficient number of special constables to be sworn in, and such special constables shall, under the directions of the inspector *or sub-inspector* proceed to the premises of such owner or possessor and assist the inspector *or sub-inspector. Inspector may* [to] seize all the diseased colonies and infected appurtenances and burn them forthwith, and if necessary the said inspector or constables may arrest the said owner or possessor, and bring him before a justice of the peace to be dealt with according to the provisions of the preceding sections of this Act.

9. Before proceeding against any person before a justice of the peace, the said inspeetor shall read over to such person the provisions of this Act or shall cause a copy thereof to be delivered to such *a* person.

10. Every bee-keeper or other person who is aware of the existence of foul brood, either in his own apiary or elsewhere, shall immediately notify the president of the *County District or Provincial* [Ontario Bee-Keepers'] Association of the existence of such disease, and in default of so doing shall on summary conviction before a justice of the peace be liable to a fine of $5 and costs.

11. Upon receiving the notice in the preceding section mentioned or in any way becoming aware of the existence of foul brood in any locality, the said president shall immediately direct the said inspector to proceed [to] and inspect infected premises; but where [the person giving such notice is unknown to the president or] there is reason to believe that the information in such notice is untrustworthy, or that the person giving such notice is actuated by improper motives, then the president may require the person giving such notice to deposit the sum of $5 with the president as a guarantee of good faith, before the said notice is acted upon, and if it proves that the said notice was properly given, then the said deposit shall be returned to the person giving such notice, but otherwise the said deposit shall be forfeited to the use of the said Ontario Bee-Keepers' Association.

12. The said Association shall [include in its] *report annually* to the Minister of Agriculture a statement of the inspector's *or sub-inspector's* work during the preceding year, which statement shall include *the location of apiary visited, and the date of visit with condition of apiary, whether clean or foul, and* the number of colonies destroyed by order of the inspector *or sub-inspector*, and the localities where found, and the amount paid to him *or the sub-inspector* for their services and expenses for the preceding year.

13. The directors of the said Association may from time to time make such by-laws and regulations for the control and guidance of the inspector in carrying out the provisions of this Act as they may deem necessary, and the said directors shall also by by-law fix the amount of the remuneration of the said inspector and sub-inspector, but all such by-laws and regulations shall be subject to the approval of the Minister of Agriculture.

THE ACT NOW IN FORCE.

AN ACT FOR THE SUPPRESSION OF FOUL BROOD AMONG BEES.

R.S.O., 1897, Chap. 283.

1.—(1) The Ontario Beekeepers' Association shall at each annual meeting, or the Directors of the said Association shall, if in the interval between two annual meetings the occasion arises, appoint an Inspector of Apiaries and a Sub-Inspector for the Province of Ontario, and the said Inspector and Sub-Inspector shall be elected by the vote of the majority of the members of said Association present at the annual meeting, or the vote of the majority of the directors as the case may be. Any annual meeting may delegate the annual appointment of an Inspector and Sub-Inspector to the newly elected Board of Directors.

(2) The said Sub-Inspector may, when so directed, as hereinafter provided perform all the duties and exercise all the powers in this Act directed to be performed or exercised by the Inspector, and the provisions of this Act relating to the Inspector shall be deemed to apply to and include the said Sub-Inspector.

(3) The Inspector or Sub-Inspector on entering upon any premises in the discharge of his duties shall, if so required, produce the certificate of the President of the said Association that he has been appointed as such Inspector, or Sub-Inspector, as the case may be. 53 V., c. 66, s. 1.

2. The said Inspector and Sub-Inspector shall hold office for one year from the date of the annual meeting at which they were appointed, or if they are appointed by the directors, then until the next annual meeting after such appointment, and shall be eligible for re-election, but the said Inspector or Sub-Inspector may at any time, subject to the approval of the Lieutenant-Governor in Council, be removed from office by the directors for neglect of duty or other sufficient cause, and in case of such removal the directors shall without delay appoint a successor. 53 V., c. 66, s. 2.

3. The said Inspector shall, whenever so directed by the President of the Ontario Beekeepers' Association, visit without unnecessary delay any locality in the Province of Ontario, and there examine any apiary or apiaries to which the said President may direct him, and ascertain whether or not the disease known as "foul brood" exists in such apiary or apiaries, and whenever the said Inspector is satisfied of the existence of foul brood in its virulent or malignant type it shall be the duty of the Inspector to order all colonies so affected, together with the hives occupied by them, and the contents of such hives, and all tainted appurtenances that cannot be disinfected, to be immedately destroyed by fire under the personal direction and superintendence of the said Inspector, and after inspecting infected hives or fixtures, or handling diseased bees, the Inspector shall, before leaving the premises, or proceeding to any other apiary, thoroughly disinfect his own person and clothing, and shall see that any assistant with him also thoroughly disinfects his person and clothing; but where the Inspector, who shall be the sole judge thereof, is satisfied that the disease exists, but only in milder types and in its incipient stages, and is being or may be treated successfully, and the Inspector has reason to believe that it may be entirely cured, then the Inspector may, in his discretion, omit to destroy or order the destruction of the colonies and hives in which the disease exists. 53 V., c. 66, s. 3.

4. The Inspector shall have full power, in his discretion, to order any owner or possessor of bees dwelling in box-hives, in apiaries where the disease exists (being mere boxes without frames), to transfer such bees to movable frame hives within a specified time, and in default of such transfer, the Inspector may destroy, or order the destruction of, such box hives and the bees dwelling therein. 53 V., c. 66, s. 4.

5. Any owner or possessor of diseased colonies of bees, or of any infected appliances for bee-keeping, who knowingly sells, or barters, or gives away such diseased colonies or infected appliances, shall, on conviction thereof, before any Justice of the Peace, be liable to a fine of not less than $50 or more than $100, or to imprisonment for any term not exceeding two months. 52 V., c. 66, s. 5.

6. Any person whose bees have been destroyed or treated for foul brood, who sells or offers for sale any bees, hives or appurtenances of any kind, after such destruction or treatment, and before being authorized by the Inspector to do so, or who exposes in his bee-yard, or elsewhere, any infected comb, honey, or other infected thing, or conceals the fact that said disease exists among his bees, shall on conviction before a Justice of the Peace, be liable to a fine of not less than $20 and not more than $50, or to imprisonment for a term not exceeding two months, and not less than one month. 53 V., c. 66 s. 6.

7. Any owner or possessor of bees who refuses to allow the Inspector or his assistant or assistants to freely examine said bees, or the premises in which they are kept, or who refuses to destroy the infected bees and appurtenances, or to permit them to be destroyed when so directed by the Inspector, may, on the complaint of the Inspector, be summoned before a Justice of the Peace, and, on conviction, shall be liable to a fine of not less than $25 and not more than $50 for the first offence, and not less than $50 and not more than $100 for the second and any subsequent offence, and the said Justice of the Peace shall make an order directing the said owner and possessor forthwith to carry out the directions of the Inspector. 53 V., c. 66, s. 7.

8. When an owner or possessor of bees disobeys the directions of the said Inspector or offers resistance to, or obstructs the said Inspector, a Justice of the Peace may, upon the complaint of the said Inspector, cause a sufficient number of special constables to be sworn in, and such special constables shall, under the directions of the Inspector, proceed to the premises of such owner or possessor and assist the Inspector to seize all the diseased colonies and infected appurtenances and burn them forthwith, and if necessary the said Inspector or constables may arrest the said owner or possessor and bring him before a Justice of the Peace to be dealt with according to the provisions of the preceding section of this Act. 53 V., c. 66, s. 8.

9. Before proceeding against any person before a Justice of the Peace, the said Inspector shall read over to such person the provisions of this Act or shall cause a copy thereof to be delivered to such person. 53 V., c. 66, s. 9.

10. Every beekeeper or other person who is aware of the existence of foul brood, either in his own apiary or elsewhere, shall immediately notify the President of the Ontario Beekeepers' Association of the existence of such disease, and in default of so doing shall on summary conviction before a Justice of the Peace be liable to a fine of $5 and costs. 53 V., c. 66, s. 10.

11. Upon receiving the notice in the preceding section mentioned or in any way becoming aware of the existence of foul brood in any locality, the said President shall immediately direct the said Inspector to proceed to and inspect the infected premises; but where the person giving such notice is unknown to the President, or there is reason to believe that the information in said notice is untrustworthy, or that the person giving such notice is actuated by improper motives, then the President may require the person giving such notice to deposit the sum of $5 with the President as a guarantee of good faith, before the said notice is acted upon, and if it proves that said notice was properly given, then the said deposit shall be returned to the person giving such notice, but otherwise the said deposit shall be forfeited to the use of the said Ontario Beekeepers' Association.

12. The said Association shall include in its annual report to the Minister of Agriculture a statement of the Inspector's work during the preceding year, which statement shall include the number of colonies destroyed by order of the Inspector and the localities where found, and the amount paid to him for his services and expenses for the preceding year. 53 V., c. 66, s. 12.

13. The directors of the said Association may from time to time make such by-laws and regulations for the control and guidance of the Inspector in carrying out the provisions of this Act as they may deem necessary, and the said directors shall also by by-law fix the amount of the remuneration of the said Inspector and Sub-Inspector, but all such by-laws and regulations shall be subject to the approval of the Minister of Agriculture. 53 V., c. 66, s. 13.

BY-LAWS.

1. This Association shall be known as the Ontario Bee-Keepers Association, and shall be composed of those interested in bee-keeping who become enrolled as members by paying the annual membership fee of one dollar.

2. A general meeting of the members of this Association shall be held once a year, and shall be known as the Annual Meeting, the year to begin with the election of officers at such Annual Meeting and terminate on the election of their successors at the next Annual Meeting. At this Annual Meeting, or any other general meeting of this Association, ten members in good standing shall constitute a quorum.

3. The time and place of holding the next Annual Meeting shall be fixed by the members present at the Annual Meeting.

4. The Board of Management shall consist of a President, two Vice-Presidents and nine Directors, elected one from each of the following twelve divisions :

Division No. 1.—Stormont, Dundas, Glengarry, Prescott, and Cornwall.
Division No. 2.—Lanark, Renfrew, Carleton, Russell, and Ottawa.
Division No. 3.—Frontenac, Kingston, Leeds, Grenville, and Brockville.
Division No. 4.—Hastings, Addington, Lennox, and Prince Edward.
Division No. 5.—Durham, Northumberland, Peterborough, Victoria, and Haliburton.
Division No. 6.—York, Ontario, Peel, Cardwell, and Toronto.
Division No. 7.—Wellington, Waterloo, Wentworth, Dufferin, Halton, and Hamilton.
Division No. 8.—Lincoln, Niagara, Welland, Haldimand, and Monck.
Division No. 9.—Elgin, Brant, Oxford, and Norfolk.
Division No. 10.—Huron, Bruce, Grey, and Perth.
Division No. 11.—Essex, Kent, Lahmbton, Middlesex, and London.
Division No. 12.—Algoma, Simcoe, Muskoka, Parry Sound, Nipissing, and Manitoulin.

Also one Director from the Ontario Agricultural College and Experimental Farm.

The Board of Management so elected shall appoint from among themselves, or otherwise, a Secretary and a Treasurer, and shall also appoint at least three of their number as an Executive Committee.

5. Five members of the Board shall constitute a quorum.

6. Vacancies on the Board by death or resignation may be filled by the President, subject to the approval of the Executive Committee.

7. The officers of this Association shall be elected by ballot, with the exception of the Auditor, who may be elected by an open vote of the Association.

8. It shall be the duty of the President to preside at all meetings of this Association ; to call for reports ; to put motions when seconded ; to decide upon questions of order, and to declare the result of ballots and elections. The President, in connection with the Secretary, shall have power to call special meetings when necessary. The President shall be ex-officio chairman of the Board of Directors, and shall call it together when necessary.

9. In the event of the death or absence of the President, the Vice-President shall discharge his duties.

10. It shall be the duty of the Secretary to keep and preserve the books of the Association ; to call the roll and read the minutes at every meeting of the Association ; to conduct all correspondence of the Association ; to receive and transfer all moneys received for fees and otherwise to the Treasurer, having taken a receipt for the same ; to make out a statistical report for the Association and for the Government ; to furnish the officers of the County and District Associations with forms for organization and annual reports, and to give notice of Association and Board meetings through the press or otherwise.

11. It shall be the duty of the Treasurer to furnish such securities for the moneys of the Association as the Board may determine ; to receive from the Secretary all moneys belonging to the Association, and to give receipts for the same ; to pay them out on order endorsed by the President and Secretary, and to render a written report of all receipts and disbursements at each Annual Meeting.

12. Any County or District Bee-keepers' Association in the Province of Ontario may become affiliated to this Association on payment of five dollars, which shall be paid to the Secretary on or before the first day of June in each year; but every local Association so affiliated must have on the membership roll at least five members who are also members of the Ontario Bee-keepers' Association at the time of its affiliation, and must continue to have a like number of its members on the roll of this Association while it remains in affiliation.

13. Every affiliated Association shall receive an annual grant out of the funds of this Association. The amount of such grant shall be fiexed by the Board from year to year.

14. All grants to affiliated Associations shall be expended in prizes for honey shows, or for shows of apiarian appliances, or for lectures on subjects pertaining to bee culture, or for advertising district or county meetings, or for any or all of these, and for no other purpose.

15. Every affiliated Association shall report to the Secretary of this Association (on a form to be supplied by the Secretary) before the first day of December in each year, which report shall be signed by the President and Secretary of the affiliated Associations.

16. County or District Associations seeking affiliation should forward to the Secretary an application according to the following form: "We, whose names are written in the accompanying form, having organized ourselves into a County (or District) Association to be known as County (or District) Association No. —, desire to become affiliated to the Ontario Bee-Keepers' Association, and we agree to conform to the Constitution and By-Laws of said Association."

Form of application as follows:

Names of those already Members of the O. B. K. A	P. O. Address	Fees.	Names of those not already Members of the O. B. K. A	P. O. Address	Fees.	Remarks

17. Every affiliated Association that neglects or refuses to pay the annual affiliation fee, or neglects or refuses to forward to the Secretary the annual report on or before the date fixed, may be deprived of their affiliation privileges by the Board.

18. Should an affiliated Association become defunct after payment to it of the grant from this Association, any unexpended balance of said grant shall be forfeited and paid over to the Treasurer of this Association.

19. Each affiliated Association shall be entitled to the privilege of two representatives at the meetings of this Association, in addition to those who are already members of this Association, and such representatives shall be entitled to all the rights and privileges of members of this Association.

20. Every delegate of an affiliated Association shall furnish to this Association a certificate, signed by the President and Secretary of the body which he represents, showing that he has been duly appointed a delegate of such Society.

21. Each affiliated Association shall be entitled to the services of an Association lecturer (when such exists) once in each year, half the expenses connected with such lecture to be borne by the District or County Association and half by this Association.

22. The order of business by which the meetings of this Association shall be governed shall be in the discretion of the President, but subject to appeal to the meeting when objection is taken, when a majority vote of the members present shall decide on the objection, and in such cases the vote of the majority shall be final.

23. These By-Laws may be amended by a majority vote of the members present at any Annual Meeting, or at a special meeting of the members called for the purpose of considering the same, and of which at least two weeks' notice shall be given by public advertisement.

BINDING SECT. JAN 18 1974

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